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Cattle Feeding, 1962-89

Location and Feedlot Size

Kenneth R. Krause

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Cattle Feeding, 1962-89: Location and Feedlot Size. By Kenneth R. Krause. Commodity Economics Division, Economic Research Service, U.S. Department of Agriculture. Agricultural Economic Report No. 642.

Abstract

In 1989, four Plains States, Texas, Kansas, Nebraska, and Colorado, marketed over 70 percent of the 22,955,000 cattle that were fed in 13 cattle feeding States. In 1955, six States, Iowa, Nebraska, California, Illinois, Colorado, and Kansas, marketed about the same percentage of 9,001,000 fed cattle. Cattle feedlots in 13 States decreased from about 164,000 in 1962 to about 47,000 in 1989. Seventy-nine lots finished almost one-third and 391 lots finished over two-thirds of the fed cattle in 1989. The over 46,000 smaller lots finished the remaining one-third.

Keywords: Cattle feeding location, cattle feedlot size

Acknowledgments

The author appreciates the data provided by and comments of Robert Bohall, Peter DeBraal, Terry Crawford, Lawrence A. Duewer, Ron A. Gustafson, Kenneth Nelson, Donn Reimund, and numerous journalists and analysts who have written about the beef cattle industry.

Preface

The cattle-beef industry is in a period of dynamic structural change. Acquisitions, mergers, and expansion and contraction of existing firms continually occur. The analysis in this report was based on changes for which data and information became available, for the most part, at the end of 1989. Readers with interest in more current developments are encouraged to consult current livestock and financial publications.

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Summary

The number of fed cattle marketed in the United States doubled between 1960 and 1978 and has not exceeded the peak since then. The weight of fed cattle continued to increase since 1960 so that while slightly fewer fed cattle have been marketed in recent years, the total pounds of fed beef have remained about constant. Increasing domestic consumer demand for beef and new technologies that permit more efficient production of fed beef were associated with the increased output of beef since 1960.

There was a major shift among the States that produced most of the fed beef. In 1989, four Plains States, Texas, Kansas, Nebraska, and Colorado, marketed over 70 percent of the 22,955,000 fed cattle marketed in the 13 quarterly reporting States. In 1955, six States, Iowa, Nebraska, California, Illinois, Colorado, and Kansas, marketed almost 74 percent of the 9,001,000 fed cattle. Texas showed the greatest percentage increase in fed cattle in the 34-year period, about 2,000 percent; followed by Kansas, 750 percent; Oklahoma, 435 percent; Colorado, 335 percent; and Nebraska, 290 percent. Cattle feeding in Iowa, Illinois, and California declined by 10, 27, and 41 percent.

The shift in cattle feeding to the four dominant States by 1989 was in part attributed to technological developments. For example, irrigation and improved crops substantially increased the output of high-energy feed for cattle finishing in those States. Proximity to increasing supplies of feeder cattle and development of new efficient slaughter plants in the four States, along with transportation improvements in refrigeration and deregulation, also helped to increase output.

Enactment of restrictive statutes on corporate farming in the mid to late 1970's in some of the States that lost relative position in cattle feeding likely contributed to the loss in those States and to increases in the other States. Iowa, Minnesota, South Dakota, and Wisconsin each adopted corporate farming restrictions in the 1970's and Nebraska voters approved a constitutional provision in 1982. In addition, the States with the restrictions lost as family-size farmers shifted to cash crop specialization and did not make the fixed cost expenditures for cattle feeding facilities and equipment.

The number of cattle feedlots in 13 States decreased by about 75 percent, from about 164,000 in 1962 to about 47,000 in 1989. All of the decrease came from lots of under 1,000-head, one-time capacity, while lots of 1,000-head or more capacity increased by about 30 percent. In 1989, the 79 largest cattle feedlots finished almost one-third and the 391 largest lots finished over two-thirds of all the fed cattle. The over 46,000 smaller lots finished the remaining one-third.

Since several feedlots in the 100,000-head, one-time capacity category have been in operation for several years, economies of size apparently exist or at least significant diseconomies do not exist to that size level. The large lots are able to employ highly skilled management specialists to obtain feeder cattle, provide financing, and purchase other supplies. Economies are also achieved in lot management and in frequent volume specification sales of fed cattle. Such specialists can substantially increase the lot owner's returns on equity, not only through volume transactions, but also through risk management and appropriate timing of buying and selling in

various markets. Thus, large cattle feedlot investors have applied industrial engineering, finance, and management techniques and risk avoidance techniques to their large-size feedlot enterprises. Some entrepreneurs own several feedlots and custom cattle feeding has emerged rapidly in recent years. The 10 largest feedlot companies owned 83 lots in 1988 and likely finished between one-fourth and one-third of all fed cattle.

The cattle-beef industry will continue to receive substantial competition from poultry meat and other foods for a declining proportion of the consumer budget. Thus, continued structural adjustments in location and lot size will likely be necessary for the industry to effectively utilize new technology to be competitive.

Cattle Feeding, 1962-89

Location and Feedlot Size

Kenneth R. Krause

Introduction

The number of fed cattle marketed in the United States doubled between 1960 and 1978. Marketings of fed cattle, the focus of this report, have not exceeded the 1978 peak since, but have generally fluctuated between 24 and 27 million head (table 1, fig. 1). The average dressed weight of fed cattle marketed has increased steadily from 570 pounds per head in 1960 to 677 pounds in 1989 (fig. 2). Thus, while 6 percent fewer fed cattle were marketed in 1989 than in 1978, the total dressed weight of beef increased by 5 percent. This increase was associated with the breeding of larger frame feeder cattle. Larger frame feeder cattle have the advantage of more economical feeding to greater live weight with relatively less feed use for maintenance as opposed to smaller breeds. Dressed weight was also influenced by a relative decline in the average proportion of nonfed cattle that were also included in the slaughter mix.[1]

Based on the biological nature of beef cattle, there are four components of the cattle-beef industry. The four components are: (1) cow-calf and growth, (2) feedlot, (3) slaughter and fabrication, and (4) wholesaling and retailing. There are several additional activities associated with each of these major components.

[1]Average dressed weight includes an average for fed and nonfed steers and heifers, cows, bulls, and stags. The actual dressed weight of fed steers and heifers is normally higher than average since cows, bulls, stags, and nonfed steers and heifers do not have the finish when slaughtered and dressed at lower weights. The percentage of the total cattle slaughtered that are fed thus affects the average dressed weight and varies from year to year. In 1960, for instance, only 53.6 percent of the total cattle slaughtered were fed while in 1988, 77 percent were fed.

The cow-calf and calf growth component (stocker-backgrounding) provides feeder cattle. This component is also associated with the extensive forage acreage in the United States that have had, and will likely continue to have, little or no alternative economic uses. Closely related are light to intensive pasture and hay production acres that are often a necessary part of a crop production rotation. Calves may graze on range or pasture, feeding on light grain rations and hay until they reach 600-800 or more pounds and are ready for intensive high-energy ration feeding. After weaning at about 400 pounds, calves may be held by a cow-calf operator or they may be sold to other interests, such as backgrounders who specialize in growing calves prior to the start of intensive feeding. Feedlot operators or investors who have fed cattle may enter into ownership of calves for the growing phase.

At the feedlot, the cattle are fed high-energy grain and other ingredient rations in confinement to add the final 400-700 pounds of weight on the animal. This ideally results in high-quality beef that commands a premium due to its appeal and taste to the final consumer. A small percentage of beef cattle, depending from year to year on feed costs and price outlook, may be mostly finished on pasture and harvested forage rather than fed high-energy grain rations.

Then, the fed animal is slaughtered. The carcass may be either processed and fabricated or sold to others that do the work. The inplant fabricating results in the carcass being broken down into various individual cuts and placed and shipped in individual boxes. The final component involves final wholesaling or retailing and may involve processing and fabrication.

Table 1—Estimated fed steers and heifers marketed in the United States and dressed weight, 1960-89[1]

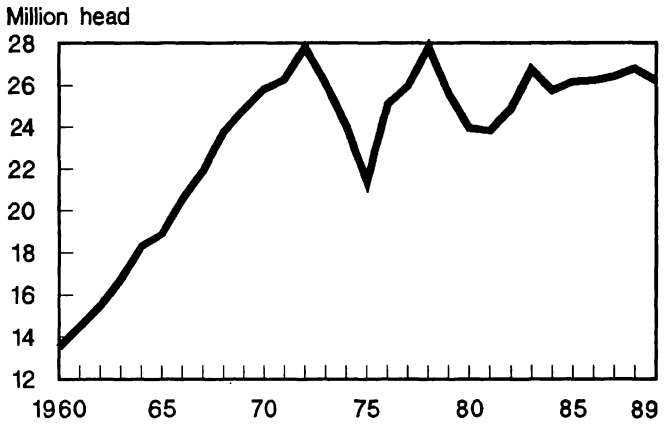
Year	Number marketed	Dressed weight[1]	Total dressed weight
	1,000 head	*Pounds*	*Million pounds*
1960	13,524	570	7,709
1961	14,530	582	8,456
1962	15,450	573	8,853
1963	16,769	589	9,877
1964	18,323	586	10,737
1965	18,907	567	10,720
1966	20,584	578	11,898
1967	21,916	590	12,930
1968	23,752	590	14,014
1969	24,853	595	14,788
1970	25,804	614	15,844
1971	26,276	611	16,055
1972	27,817	622	17,296
1973	26,106	626	16,342
1974	24,082	622	14,979
1975	21,400	579	12,391
1976	25,119	602	15,122
1977	25,967	597	15,502
1978	27,839	607	16,898
1979	25,560	631	16,129
1980	23,944	635	15,204
1981	23,827	636	15,153
1982	24,903	624	15,540
1983	25,754	629	16,199
1984	25,758	623	16,047
1985	26,181	649	16,991
1986	26,235	649	17,027
1987	26,429	657	17,364
1988	26,799	668	17,902
1989	26,209	677	17,743

[1] Average dressed weight includes an average for fed and nonfed steers and heifers, cows, bulls, and stags. The actual dressed weight of fed steers and heifers has probably been higher than the average, since cows, bulls, stags, and nonfed steers and heifers do not have the finish when slaughtered and dressed at lower weights. The percentage of the total cattle slaughtered that are fed also affects the average dressed weight and varies from year to year. In 1960, for instance, only 53.6 percent of the total cattle slaughtered were fed while in 1989, 77 percent were fed.

Source: U.S. Dept. Agr., Econ. Res. Serv., estimated commercial cattle slaughter and production. Data first developed in 1960.

Figure 1

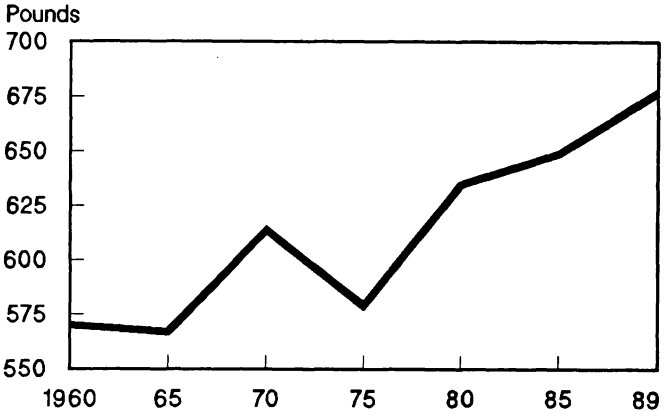
Estimated number of fed steers and heifers, marketed in the United States, 1960-89



Source: U.S. Dept. Agr., Econ. Res. Serv., commercial cattle slaughter and production estimates. The data were first developed for 1960.

Figure 2

Average dressed weight of commercial cattle marketed, 1960-89



Source: U.S. Dept. Agr., Econ. Res. Serv., commercial cattle slaughter and production estimates. The data were first developed for 1960. The average dressed weight includes an average for fed and nonfed steers and heifers, cows, bulls, and stags.

At each stage, a market exchange with other components in the system takes place. Participants in the industry try to maximize their returns by combining two or more components, such as cow-calf raising and grain production or feeding and slaughtering cattle.

There have been two major structural changes in the fed cattle industry over the past three decades: change in the location of cattle feeding and change

Vertical Coordination

Except where States with restrictive corporate and partnership statutes have effectively discouraged ownership of more than one component, individuals, corporations, and partnerships have been able to have a full or partial interest in three of the components. In 1920, the then five largest meatpackers entered into a consent decree with the Federal Government to stop their vertical ownership and control activities (*1, 2*).[2]

in the size and number of cattle feedlots. Both changes started during the first half of the period when fed cattle numbers doubled (between 1960 and 1972). However, structural changes continued at an accelerated rate during the past decade and a half.

Reimund, Martin, and Moore explained the nature of the structural change process in agriculture by examining location and feedlot size (*2*). While location and increasing size of cattle feedlots are closely related, several factors seem unique to each, according to the three analysts. For instance, development of crop irrigation equipment in the 1950's permitted irrigation of crops in the Southern Plains States of Kansas, Oklahoma, and Texas. Development of hybrid sorghum provided a suitable feed grain crop that was intensively grown for cattle feed. Federal commodity programs encouraged hybrid sorghum adoption and a rapid increase in output to supplement imported feed from other States.

In addition, the mild, dry climate of the Southern Plains, along with its low population density, provided a suitable environment for large-scale cattle feeding. Nearby, Texas, Oklahoma, Kansas, and southeastern cow-calf operations provided an ample supply of feeder cattle.

While Reimund, Martin, and Moore interrelated the changing location of cattle feeding and feedlot size, expanded cattle feeding in the Southern Plains may have occurred, due to favorable climate, in small lots without the new technology that provided incentives for large feedlots to develop. The three analysts enumerated several biological products that became available in the 1950's that permitted confinement of large numbers of cattle in small spaces. These products included feed additives, growth stimulants, urea, pest control, and new and improved animal medicines.

They also suggested that industrial-type entrepreneurial skills were adopted that resulted in raising funds to construct and operate large feedlots and in raising the necessary funds to bear the risk of feeding cattle. Federal tax regulations also provided tax cost-saving incentives to construct the lots and to feed large numbers of cattle. The large lots permitted managerial specialization for such activities as buying feeder cattle and feed, daily management of the lots, and selling cattle which in turn led to technical and market exchange economies of size for large lots.

The increasing availability of computer hardware and software and communications equipment has aided managerial functions in large lots, such as least-cost ration formulation and individual pen analysis. New computers also permitted following and analyzing futures and cash markets which can result in risk reduction and increased returns on investor equity.

In the 1960's, the Federal and State governments became concerned about various types of pollution to which cattle feeders were required to respond. Reimund and others observed that the net effect of the costs of handling pollution favored large feedlots over small ones since the required fixed investment per animal marketed was lower for the large lots.

The Wholesome Meat Act of 1967 required all State meat inspection systems to be equivalent to the Federal standards. Reimund and others concluded that the imposition of the Federal inspection standards hastened the demise of small, local meatpackers nationwide.

Major changes in the cattle feeding industry are the focus of this report. The first section focuses on change in location of cattle feeding. Change in the number and size of cattle feedlots while interrelated to location is covered in the second section. Major incentives that may have contributed to the change in number and size of feedlots, such as economies

[2]Italicized numbers in parentheses refer to sources listed in the References at the end of each section.

of size and Federal income tax incentives, are also covered. The last section suggests priorities for research.

References

1. Crom, Richard J. *Economics of the U.S. Meat Industry.* AIB-545. U.S. Dept. Agr., Econ. Res. Serv., Nov. 1988.

2. Reimund, Donn A., J. Rod Martin, and Charles V. Moore. *Structural Change in Agriculture: The Experience for Broilers, Fed Cattle, and Processing Vegetables.* TB-1648. U.S. Dept. Agr., Econ. and Stat. Serv., Apr. 1981.

Changes in Location of Cattle Feeding

Between 1955 and 1989, 10 of 13 cattle feeding States from which USDA's National Agricultural Statistics Service (NASS) enumerated data showed increases in fed cattle marketed, with 7 of the 13 States showing increases in the market share or percentage of the Nation's total fed beef marketed (tables 2 and 3). Six of the 13 States showed decreases in market share, ranging up to 14 percent in Iowa (table 3).

Over the 1955-89 period, Texas showed the greatest increase in fed cattle marketed, a twentyfold gain (about 5 million head); followed by Kansas, 750 percent (about 3.7 million head); Oklahoma, 435 percent (622,000 head); Colorado, 335 percent (1.8 million head); and Nebraska, 290 percent (3.8 million head) (*3, 4*). Iowa, California, and Illinois were losers with drops of 10 percent (about 200,000 head), 27 percent (about 350,000 head), and 41 percent (about 422,000 head).

Change in the relative importance of the States occurred within the 34-year period. Iowa, with a 4.522-million-head peak in 1970, was substantially ahead of all other States (table 2). Illinois and California peaked in number of head fed in 1965. The three States showed steady declines from their peak years, while Texas, Kansas, Colorado, and Nebraska generally showed steady increases throughout the period. Oklahoma peaked in 1978 with 833,000 head and did not reach that number again.

Table 4 highlights State concentration changes between 1955 and 1989 by showing the top eight States for marketing fed cattle. Nebraska was the only State in the top four in both 1955 and 1989. Texas was a new top four entrant in 1980 and was in the lead spot but dropped to number 2 behind Nebraska in 1989. Kansas and Colorado were in the top eight in 1955 and moved to the top four in 1989. Missouri moved out of the top eight between 1955 and 1980 and was replaced by Oklahoma in 1989.

Location and Lot Size Data

A note about the data on location and size of cattle feeding and cattle feedlots is appropriate. The Statistical Reporting Service--now National Agricultural Statistics Service (NASS)--provided data for most of the analysis in this report. The number of cattle and number of feedlots shown in the tables for each State are thought to be accurate. The number of lots in the various size categories and the number of cattle fed by the various size lots may not be exact since NASS frequently has to combine data for lots of two or more sizes to avoid disclosure of individual lots. The data are generally combined into smaller lot sizes. Thus, in general, the analysis in this section may understate the importance of large lots.

Regional Shift in Cattle Feeding Location

On a regional basis, Texas, Oklahoma, Kansas, Nebraska, and Colorado (area I) increased from 30 percent of the fed cattle marketed in 1955 to 75 percent in 1989 (figs. 3 and 4). During the same period, the Corn Belt States (Minnesota, South Dakota, Iowa, and Illinois) (area II) dropped from 42 percent of the fed cattle marketed to 15 percent. California and Arizona (area III) dropped from 18 to 6 percent. The Northwest (Idaho and Washington) (area IV) stayed about constant.

Area I

No one factor explains the change in cattle feeding location. Table 5 shows that the total number of farms in area I decreased 39.1 percent between 1955 and 1989, while the percentage decrease in former leading cattle feeding States, Iowa and Illinois, was 46 and 52 percent. While the decrease in number of farms in Iowa and Illinois and other similiar small feedlot States contributed to the decrease in cattle feeding in those States since 1955, other factors were also important in the

Table 2—Fed cattle marketed and percentage change in 23 States, 1955-89

State	1955	1960	1965	1970	1975	1980	1985[1]	1989	Change 1955-80	Change 1955-89
	1,000 head								*Percent*	
Thirteen States:										
Texas	227	477	1,094	3,138	3,067	4,160	5,030	4,745	1,732.6	1,990.3
Kansas	498	593	857	1,890	2,264	3,015	3,865	4,245	505.4	752.4
Oklahoma	NA	143	300	542	515	650	750	765	[2] 354.5	[2] 435.0
Colorado	534	738	1,144	1,905	1,838	1,951	2,110	2,315	265.4	333.5
Nebraska	1,304	1,434	2,438	3,609	2,795	3,825	4,600	5,070	193.3	288.8
Idaho	NA	231	271	434	330	568	472	617	[2] 145.9	[2] 167.1
Washington	NA	220	308	348	315	400	496	436	[2] 81.8	[2] 98.2
South Dakota	331	362	561	552	561	600	685	570	81.1	72.2
Minnesota	459	600	684	877	762	760	575	525	65.6	14.4
Arizona	313	466	650	860	729	554	510	342	76.7	9.3
Iowa	1,975	2,565	3,293	4,522	2,645	2,690	1,850	1,775	36.2	-10.1
California	1,280	1,595	2,282	1,966	1,650	1,253	1,049	930	-2.1	-27.3
Illinois	1,042	1,255	1,310	1,167	805	880	920	620	-15.5	-40.5
Ten States:										
New Mexico	NA	113	177	399	270	332	NA	NA	193.8	NA
Wisconsin	NA	164	194	217	186	202	NA	NA	[2] 23.2	NA
Michigan	NA	180	219	254	244	207	NA	NA	[2] 15.0	NA
Oregon	NA	117	167	166	145	134	NA	NA	[2] 14.5	NA
Ohio	229	316	456	429	379	244	NA	NA	6.6	NA
Indiana	365	327	428	517	346	344	NA	NA	-5.8	NA
Montana	NA	115	142	184	132	83	NA	NA	[2] -27.8	NA
Pennsylvania	NA	146	116	128	117	88	NA	NA	[2] -39.7	NA
Missouri	444	483	660	684	338	185	NA	NA	-58.3	NA
North Dakota	NA	176	175	96	67	73	NA	NA	[2] -58.5	NA
Total	9,001	12,816	17,926	24,884	20,500	23,198	22,912	22,955	157.7	155.0

NA = Not available.

[1]The Statistical Reporting Service (now National Agricultural Statistics Service) discontinued obtaining fed cattle marketed in 10 of the 23 States after 1981. The 10 States accounted for 8.2 percent of the fed cattle marketed in the 23 States in 1980.

[2]The base year was 1960.

Source: Various issues of *Cattle on Feed*, U.S. Department of Agriculture, National Agricultural Statistics Service. For brief periods in the early 1960's, the Statistical Reporting Service enumerated data from up to nine more States, but the States marketed such a small percentage of the total that enumeration was discontinued.

change in location of cattle feeding. Cattle feeding analysts suggest that the increase in number of fed cattle marketed in area I was associated with the increased output of high-energy feed for cattle finishing (*1, 5*). They also suggested that Federal income tax laws were also very favorable, at least until the mid-1970's, in terms of investment credit and current expensing, toward construction of large cattle feedlots in the Great Plains. The tax laws were also favorable for investors. Investors were able to feed enough cattle in the lots so they could become and remain viable in the industry. Tax considerations are covered in greater depth in appendix II.

In the early 1970's, cattle feeding analysts questioned whether output of feed and number of cattle fed could be maintained given that available irrigation water, especially in Texas, was decreasing (*5*). Table 6 shows that the output of cattle feed continued to increase even though the acres planted to feed crops decreased in some years when grain producers participated in Federal commodity programs that required them to take some acres out of grain production. The change in the output of corn, barley, grain sorghum, and wheat was highly variable within and among the States, indicating that new crop production technology helped with increasing total U.S. output of the four crops.

Table 3—Percentage of fed cattle marketed by State and change in percentage of the total, 23 States, 1955-89

State	1955	1960	1965	1970	1975	1980	1985[1]	1989	Change 1955-80	Change 1955-89
					Percent					
Thirteen States:										
Texas	2.5	3.7	6.1	12.6	15.0	17.9	22.0	20.7	15.4	18.2
Kansas	5.5	4.6	4.8	7.6	11.0	13.0	16.9	18.5	7.5	13.0
Nebraska	14.5	11.2	13.6	14.5	13.6	16.5	20.1	22.1	2.0	7.6
Colorado	5.9	5.8	6.4	7.7	9.0	8.4	9.2	10.1	2.5	4.2
Oklahoma	NA	1.1	1.7	2.2	2.5	2.8	3.3	3.3	[2] 1.7	[2] 2.2
Idaho	NA	1.8	1.5	1.7	1.6	2.4	2.1	2.7	[2] .6	[2] .9
Washington	NA	1.7	1.7	1.4	1.5	1.7	2.2	1.9	[2] -.1	[2] .2
South Dakota	3.7	2.8	3.1	2.2	2.7	2.6	3.0	2.5	-1.1	-1.2
Arizona	3.5	3.6	3.6	3.5	3.6	2.4	2.2	1.5	-1.1	-2.0
Minnesota	5.1	4.7	3.8	3.5	3.7	3.3	2.5	2.3	-1.8	-2.8
Illinois	11.6	9.8	7.3	4.7	3.9	3.8	4.0	2.7	-7.8	-8.9
California	14.2	12.4	12.7	7.9	8.0	5.4	4.6	4.1	-8.8	-10.1
Iowa	21.9	20.0	18.4	18.2	12.9	11.6	8.1	7.7	-10.3	-14.2
Ten States:										
New Mexico	NA	.9	1.0	1.6	1.3	1.4	NA	NA	[2] .5	NA
Wisconsin	NA	1.3	1.1	.9	.9	.9	NA	NA	[2] -.4	NA
Michigan	NA	1.4	1.2	1.0	1.2	.9	NA	NA	[2] -.5	NA
Oregon	NA	.9	.9	.7	.7	.6	NA	NA	[2] -.3	NA
Ohio	2.5	2.5	2.5	1.7	1.9	1.1	NA	NA	-1.4	NA
Indiana	4.1	2.6	2.4	2.1	1.7	1.5	NA	NA	-2.6	NA
Montana	NA	.9	.8	.7	.6	.4	NA	NA	[2] -.5	NA
Pennsylvania	NA	1.1	.7	.5	.6	.4	NA	NA	[2] -.8	NA
Missouri	4.9	3.8	3.7	2.7	1.7	.8	NA	NA	-4.1	NA
North Dakota	NA	1.4	1.0	.4	.3	.3	NA	NA	-1.1	NA

NA = Not available.

[1]The Statistical Reporting Service (now National Agricultural Statistics Service) discontinued obtaining fed cattle marketed in 10 of the 23 States after 1981. The 10 States accounted for 8.2 percent of all the fed cattle marketed in the 23 States in 1980.

[2]The base year was 1960.

Source: Various issues of *Cattle on Feed*, U.S. Department of Agriculture, Statistical Reporting Service and National Agricultural Statistics Service.

However, individual States found that production technology was location-specific by crop. Therefore, depending on the State, the output of some crops increased or decreased more than others. While the water table continues to drop, especially in the Ogallala aquifer and in some of the Plains States, more capital-intensive water conserving irrigation equipment, tillage techniques, and plant breeding are expected to prolong the available water and feed and silage output.

Though ample grain is produced in a State or region to support high cattle fed numbers, the grain may not necessarily be utilized in that State. Grain producers do not necessarily feed cattle, especially in the States with large lots, and they have a variety of domestic and international markets. Cattle feeders, especially in the States with large lots, are not necessarily grain producers. Some of the early harvested grain from Southern States may be sold at a premium price to the export market.

Analysts generally believe, although without full documentation, that rail and truck rate deregulation in the 1970's, along with larger rail grain cars and larger permitted road grain trailers, has permitted economical transport of cattle feed supplies to the large Southern Plains cattle feedlots (*6*). In some cases, the cost of transporting grain may have decreased by 30 percent or more between 1981 and 1986. Major grain companies involved in supplying feed to cattle feedlots, some of which they own, are in the national grain market daily. Thus, they are also able to negotiate favorable large

Table 4—State concentration in fed cattle marketed, 1955-89

State	1955	1980	1989
	Percent marketed		
Top four, 1955:			
Iowa	21.9	11.6	7.7
Nebraska	14.5	16.5	22.1
California	14.3	5.4	4.1
Illinois	11.6	3.8	2.7
Total	62.3	37.3	36.6
Next four, 1955:			
Colorado	5.9	8.4	10.1
Kansas	5.5	13.0	18.5
Minnesota	5.1	3.3	2.3
Missouri	4.9	.8	NA
Total	21.4	25.5	30.9
Eight-State total	83.7	62.8	67.5
Top four, 1980:			
Nebraska	14.5	16.5	22.1
Texas	2.5	17.9	20.7
Kansas	5.5	13.0	18.5
Iowa	21.9	11.6	7.7
Total	44.4	59.0	69.0
Next four, 1980:			
Colorado	5.9	8.4	10.1
California	14.3	5.4	4.1
Illinois	11.6	3.8	2.7
Minnesota	5.1	3.3	2.3
Total	36.9	20.9	19.2
Eight-State total	81.3	79.9	88.2
Top four, 1989:			
Nebraska	14.5	16.5	22.1
Texas	2.5	17.9	20.7
Kansas	5.5	13.0	18.5
Colorado	5.9	8.4	10.1
Total	28.4	55.8	71.4
Next four, 1989:			
Iowa	21.9	11.6	7.7
California	14.3	5.4	4.1
Oklahoma	NA	2.8	3.3
Illinois	11.6	3.8	2.7
Total	47.8	23.6	17.8
Eight-State total	76.2	79.4	89.2

NA = Not available.

Source: Various issues of *Cattle on Feed*, U.S. Department of Agriculture, Statistical Reporting Service and National Agricultural Statistics Service. Twenty-three States were included in selecting those for the top four and the next four States in 1955 and 1980. Thirteen States were included in 1989.

use volume transportation rates. Feed may be transported across several States to its final use in a cattle feedlot.

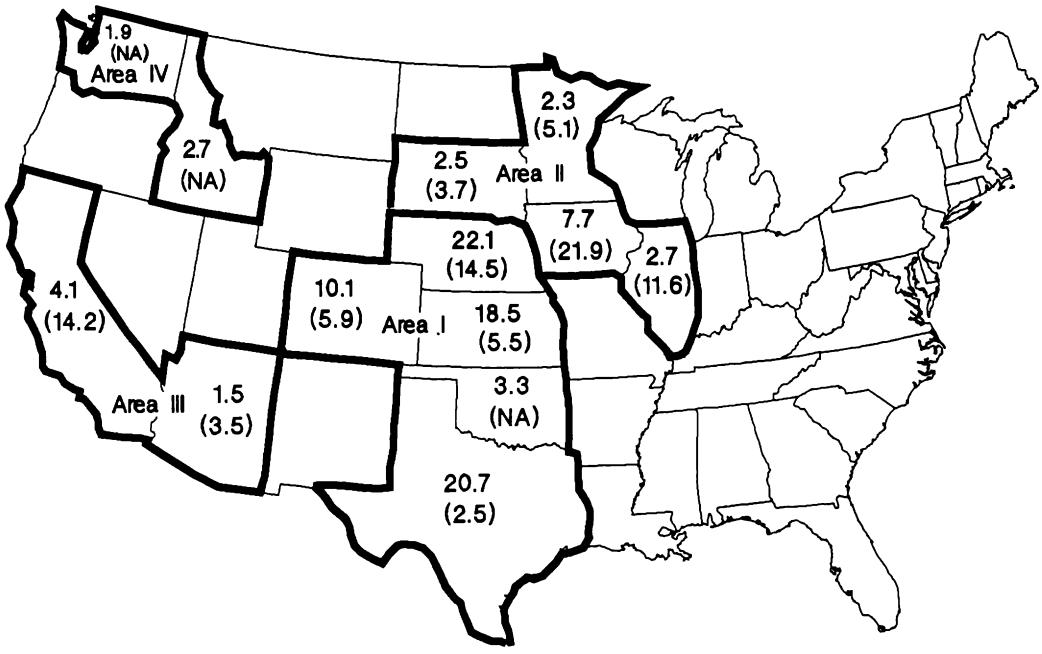
Several additional factors were also important in the shift of cattle feeding to the five States of Texas, Oklahoma, Kansas, Nebraska, and Colorado in area I. Year-round climate conditions permit continuous cattle feeding without the need for expensive shelter or total hard surfacing of feedlot pens. While environmental concerns, such as required manure disposal, are a problem, the dry climate in much of area I permits a substantial buildup of manure at low liquid levels before removal is necessary. Aeration of large volumes of manure, once it is moved into piles, may be required to meet clean air standards.

The area I States are located close to large concentrations of cow-calf herds and available grazing acres to grow feeder cattle to feedlot size. Modern, efficient slaughter and fabricating plants with boxing capability have located and expanded close to expanding feedlots in the States. Boxed beef can be shipped to population centers for less than the alternative cost of fattening and slaughtering of cattle, and fabricating of beef in areas close to consumption centers.

Area II

In area II, Iowa, Illinois, and Minnesota peaked in number of fed cattle marketed before the first major U.S. wheat sale to the Soviet Union in the early 1970's. Soon after, cash corn prices increased from about $1.00 to $3.00 per bushel and farmers saw greater returns from cash grain sales than from feeding cattle. Former cattle feeders expanded their crop acres and storage capabilities. They adopted larger crop machines, improved seeds, chemicals, and handling and drying equipment. They concentrated on crop production while their cattle feeding equipment and facilities deteriorated or were converted to other uses. Increased corn and soybean export demand at Illinois and Indiana's barge ports tended to further favor crop production over cattle feeding in those States. In contrast, in South Dakota, which has no river barge traffic, fed cattle numbers increased slightly between 1970 and

Figure 3
Percentage of fed cattle marketed in 13 States, 1955 and 1989[1]



[1]Top percentage is for 1989. Percentage in bracket is for 1955. NA = Not available for 1955. In 1960, Idaho marketed 1.9 percent, Oklahoma 1.1 percent, and Washington 1.8 percent of the fed cattle.

1989, in part because of the proximity of feeder cattle and grain production in the State.

Large lots will not likely be constructed in area II since lot costs and operating costs are higher than in the arid States where cattle feeding is concentrated. Costly shelter is necessary for protection from winter storms. Partial lot hard surfacing is necessary for stress prevention, as are costly manure storage and disposal systems. While feed costs less than in the area I States, conversion may not be as good, given the sudden and prolonged changes in temperature and humidity which tend to reduce rates of gain. Thus, feedlots in area I can pay added feed transportation costs from area II and put on a pound of gain for the same or lower costs than in area II.

Area III

The early leaders in large cattle feedlot size, California and Arizona (area III), had a 12-percent decrease in fed cattle marketed nationally between 1955 and 1989, with all of the decrease occurring in California. Several factors were associated with the decrease in cattle feeding in the two States from the peak in 1965.

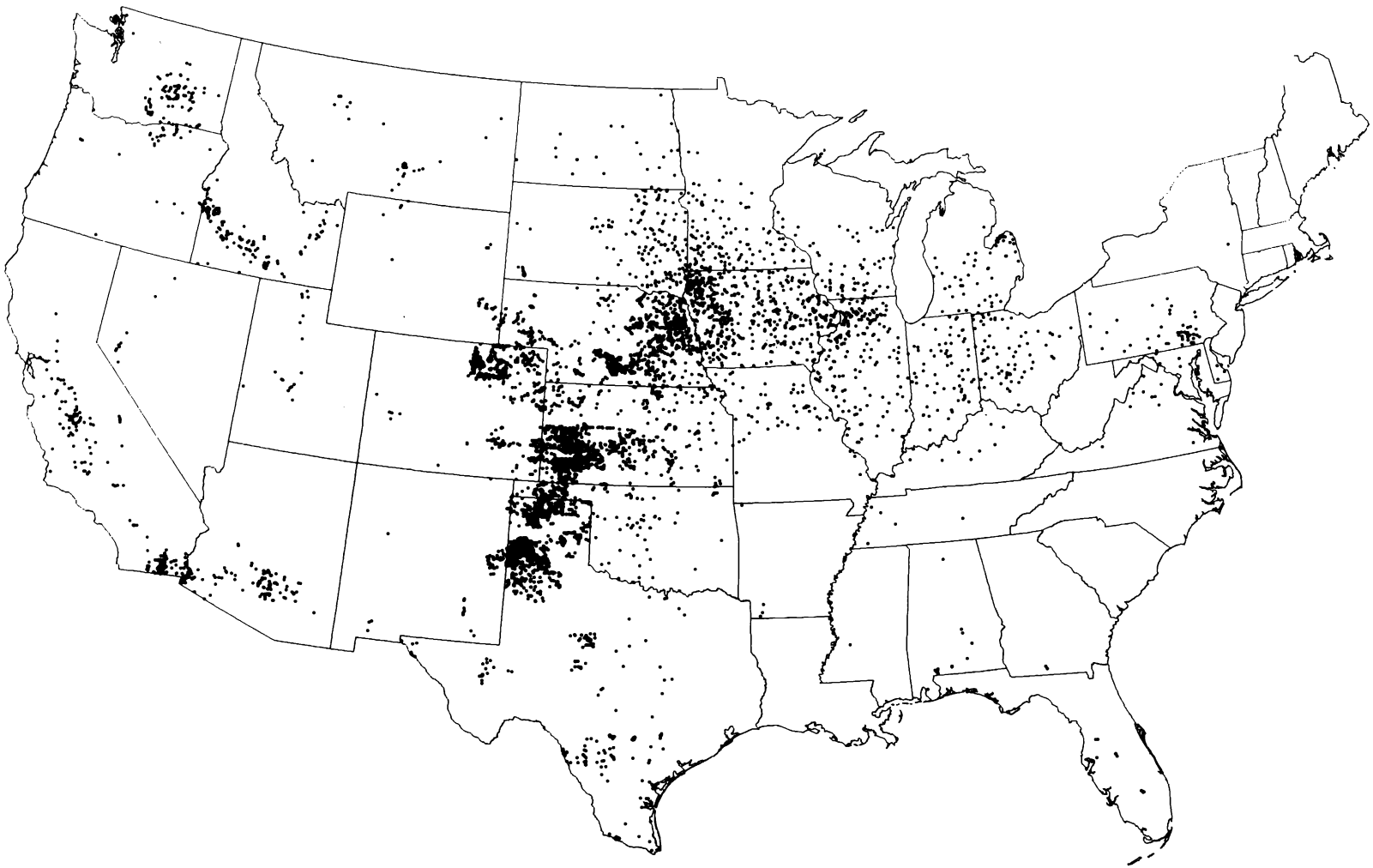
Population growth in the two States accounted for an increased demand for beef. However, the larger population also increased environmental concerns and increased water costs that resulted in decreased local feed supplies. Also, as the population expanded, the area became deficient in feeder cattle. As feedlot land increased in value, some of the lots' space was converted to other uses. Beef slaughter plants in area III also faced increased environmental concerns and increased location costs. As a result, the shipment of boxed beef to area III is less costly than feeding and slaughtering in the two States.

Area IV

Washington and Idaho (area IV) held at about the same percentage of the Nation's fed cattle between 1960 and 1989. The 602,000 increase in the number of fed cattle was associated with proximity to feeder cattle, increasing availability and use of potato processing waste, and proximity to the increasing west coast population centers.

Figure 4

Cattle fattened on grain and concentrates and sold for slaughter, 1987



Note: One dot equals 6,000 fattened cattle. U.S. total equals 27,817,762.
Source: U.S. Department of Commerce, Bureau of the Census.

Table 5—Change in number of farms by State and number of fed cattle marketed, 23 States, 1955-89

State	Number of farms[1]		Change, 1955-89	Change in number of cattle marketed, 1955-89
	1955	1989		
	Number		*Percent*	
Thirteen States:				
Texas	289,000	186,000	-35.6	1,990.3
Kansas	121,000	69,000	-43.0	752.4
Oklahoma	118,000	70,000	-40.7	[2] 435.0
Colorado	42,000	27,000	-35.7	333.5
Nebraska	102,000	57,000	-44.1	288.8
Idaho	38,900	22,100	-43.2	[2] 167.1
Washington	61,000	38,000	-37.7	[2] 98.2
South Dakota	63,500	35,000	-44.9	72.2
Minnesota	168,000	90,000	-46.4	14.4
Arizona	9,700	8,100	-16.5	9.3
Iowa	195,000	105,000	-46.2	-10.1
California	124,000	84,000	-32.3	-27.3
Illinois	178,000	86,000	-51.7	-40.5

	1955	1989	Change, 1955-80	Change in number of cattle marketed, 1955-80
	Number		*Percent*	
Ten States:				
New Mexico	22,000	14,000	-36.4	[3] 193.8
Wisconsin	155,000	93,000	-40.0	[3] 23.2
Michigan	138,000	66,000	-52.2	[3] 15.0
Oregon	51,000	35,000	-31.4	[3] 14.5
Ohio	174,000	94,000	-46.0	6.6
Indiana	150,000	88,000	-41.3	-5.8
Montana	34,800	23,900	-31.3	[3] -27.8
Pennsylvania	124,000	62,000	-50.0	[3] -39.7
Missouri	200,000	120,000	-40.0	-58.3
North Dakota	61,500	38,500	-37.4	[3] -58.5

[1]See table 2 for tabulation of change in the number of fed cattle marketed.

[2]The time period did not seem to be related to change in number of farms and number of fed cattle marketed. For instance, between 1980-89, Texas lost 13.5 percent of its farms while the number of fed cattle marketed increased 26.1 percent, Iowa lost 11.6 percent of its farms and marketed 34.9 percent fewer fed cattle, while Illinois lost 21.5 percent of its farms and marketed 6.25 percent fewer cattle.

[3]1960 data were used for the base.

Source: Various issues of *Farm Numbers* and *Crop Production*, U.S. Department of Agriculture, Statistical Reporting Service and National Agricultural Statistics Service.

State Restrictions

Restrictive State statutes on corporate farming may have had an effect on the changing location of cattle feeding. This may have been the case when several Northern Plains and Corn Belt States enacted legislation that either banned or restricted outside investment, particularly when a corporate form of business organization was used (fig. 5). Appendix I focuses on States with restrictive statutes that were and are involved in cattle feeding and the effects on those States.

Table 6—Barley, corn, grain sorghum, and wheat production in 23 cattle feeding States, 1955-85

State	Corn					Barley				
	1955	1965	1975	1985	Change, 1955-85	1955	1965	1975	1985	Change, 1955-85
	1,000 bushels				*Percent*	*1,000 bushels*				*Percent*
Thirteen States:										
Texas	32,572	19,371	113,300	156,450	380.3	2,072	2,698	2,380	2,250	-16.6
Kansas	34,103	61,850	137,760	152,100	346.0	12,728	3,657	1,925	9,680	23.9
Oklahoma	3,370	9,371	6,800	6,148	82.4	3,029	8,308	2,790	1,900	-37.3
Colorado	16,650	13,632	48,825	103,555	522.0	8,875	10,832	12,190	21,760	145.2
Nebraska	107,424	249,550	503,200	953,600	787.5	3,800	1,110	1,188	3,840	1.0
Idaho	3,410	1,500	2,075	10,000	193.3	19,584	24,451	37,750	71,920	267.2
Washington	2,812	1,725	3,536	21,600	668.1	18,450	14,820	21,200	56,640	207.0
South Dakota	87,318	92,079	83,250	252,000	188.6	9,198	8,094	16,492	32,400	252.2
Minnesota	284,935	261,080	407,400	724,500	154.3	28,788	25,960	31,875	70,950	146.5
Arizona	1,250	560	396	2,205	76.4	11,280	10,557	8,625	6,014	366.8
Iowa	522,200	814,506	1,107,000	1,107,300	226.9	660	230	NA	NA	NA
California	16,170	12,816	27,686	46,400	187.0	68,925	71,502	60,420	24,780	-64
Illinois	523,992	919,038	1,253,960	1,534,950	192.9	4,760	840	588	NA	NA
Ten States:										
New Mexico	1,092	585	7,000	10,075	822.6	800	768	1,624	1,050	31.1
Wisconsin	137,000	122,056	198,370	358,450	161.6	2,590	1,325	1,505	3,074	18.7
Michigan	93,186	90,341	152,800	286,650	207.6	3,468	897	1,056	2,584	-25.5
Oregon	2,562	897	935	6,600	196.6	17,888	16,974	8,850	19,250	7.6
Ohio	220,955	225,996	321,080	511,810	131.6	4,294	688	564	NA	NA
Indiana	276,136	441,894	551,740	756,450	173.9	2,665	570	420	NA	NA
Montana	3,999	168	730	1,045	161.3	41,370	50,050	50,700	30,000	174.3
Pennsylvania	61,364	55,760	88,560	151,800	147.3	9,065	7,344	7,750	4,340	-52.1
Missouri	65,204	211,752	170,100	272,800	65.1	4,025	928	396	NA	NA
North Dakota	31,410	7,252	6,732	40,320	28.5	1,698	97,760	79,800	184,250	125.5

State	Grain sorghum					Wheat				
	1955	1965	1975	1985	Change, 1955-85	1955	1965	1975	1985	Change, 1955-85
	1,000 bushels				*Percent*	*1,000 bushels*				*Percent*
Thirteen States:										
Texas	148,309	294,056	374,400	241,900	63.1	14,326	76,384	131,100	187,200	1,206.7
Kansas	33,246	139,426	144,060	296,700	792.4	128,385	236,386	350,900	433,200	237.4
Oklahoma	14,404	21,830	25,080	22,500	56.2	24,160	132,916	160,800	165,000	582.9
Colorado	4,950	12,425	7,540	11,200	126.3	17,257	19,811	50,950	139,302	707.2
Nebraska	7,920	121,498	104,500	154,400	1,849.5	78,255	54,540	98,240	89,700	14.6
Idaho	NA	NA	NA	NA	NA	38,165	47,973	60,050	72,030	88.7
Washington	NA	NA	NA	NA	NA	55,832	90,828	145,140	128,250	129.7
South Dakota	976	11,658	6,422	15,000	1,436.9	27,461	36,863	62,610	111,215	305.0
Minnesota	NA	NA	NA	NA	NA	12,186	23,091	88,368	142,426	1,068.8
Arizona	6,783	12,450	11,220	1,296	-80.9	1,218	1,170	22,720	9,840	704.9
Iowa	210	3,124	1,612	NA	NA	3,364	840	3,400	5,376	59.8
California	9,126	23,700	14,904	2,988	62.3	8,883	7,383	62,227	68,860	675.2
Illinois	NA	472	4,800	36,190	NA	52,008	56,800	67,470	36,750	-31.3
Ten States:										
New Mexico	5,520	12,488	15,500	13,920	152.2	1,770	4,924	10,062	20,520	1,059.3
Wisconsin	NA	NA	NA	NA	NA	1,419	1,261	2,820	8,800	520.2
Michigan	NA	NA	NA	NA	NA	27,966	26,466	38,760	45,000	60.1
Oregon	NA	NA	NA	NA	NA	21,899	28,399	57,480	56,040	155.9
Ohio	NA	NA	NA	NA	NA	43,384	40,256	74,340	58,900	35.8
Indiana	66	560	1,152	NA	NA	34,394	36,205	64,500	37,100	7.8
Montana	NA	NA	NA	NA	NA	109,305	105,350	155,925	50,240	-54.0
Pennsylvania	NA	NA	NA	NA	NA	15,964	14,280	11,385	10,080	-36.9
Missouri	2,325	13,380	26,460	117,030	49.3	48,081	32,615	48,510	49,920	3.8
North Dakota	NA	NA	NA	NA	NA	112,942	177,915	264,392	323,255	186.2

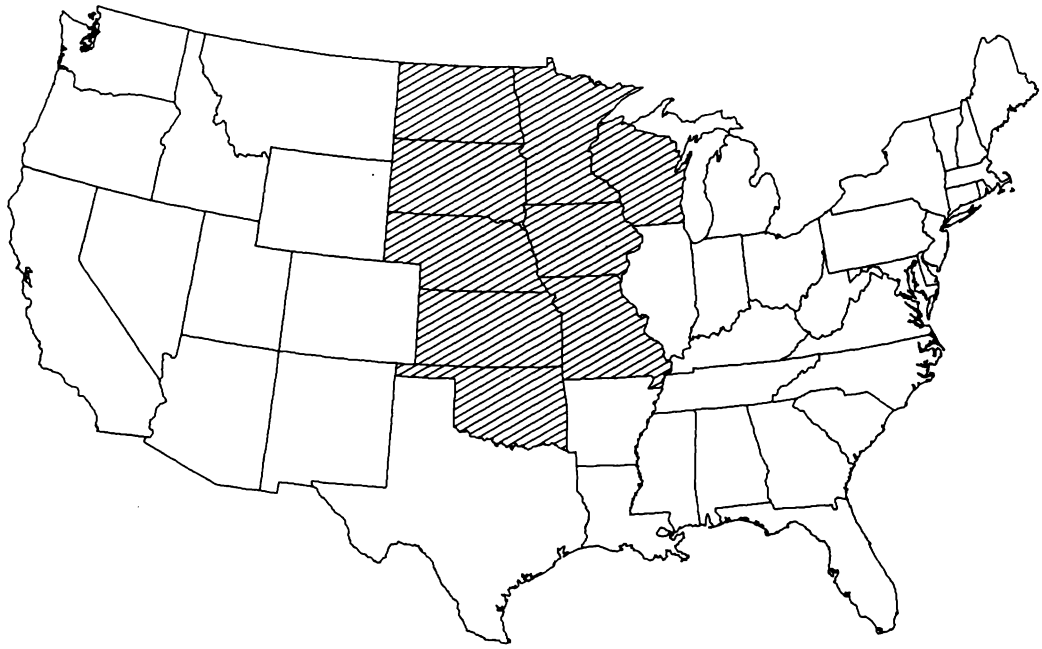
NA = Not available.

Note: Lack of an entry for a State indicates the data were not collected or estimated for that State since the aggregate production was insignificant.

Source: Various issues of *Agricultural Statistics*, U.S. Department of Agriculture, Statistical Reporting Service and National Agricultural Statistics Service.

Figure 5

States with domestic corporate farming statutes, 1986



Feedlots, Yards, and Pens

The words feedlots, yards, and pens are used to describe the physical facilities associated with the feeding of cattle in a small confined space per head. Since NASS uses the word lot and provided some of the data for this report, the word lot or feedlot is most frequently used in this report. As used by NASS, the word means site specific cattle feeding in fenced-in locations. Groups of 25 to 150 similar type and weight cattle are kept in individual pens that adjoin other pens in a feedlot. Family-size cattle feeders may have one or a few pens while large feedlots may have hundreds of pens that make up one lot. Individuals or companies may own several cattle feedlots. Commonly owned lots may be located in the same State or in several States. NASS data show individual feedlots and the State where they are located rather than the headquarters of all lots under common control.

Feedlot owners are frequently involved in other cattle and beef industry components including cow-calf production, backgrounding feeder cattle, order buying, truck or rail transportation, grain and supplement procurement or feed merchandising, or cattle slaughter or fabrication.

Family farmers' cattle feeding facilities are also classified as feedlots by NASS and most have less than 1,000-head capacity. Family farmers are most frequently involved in crop and swine production. Corn, milo, and sometimes self-produced barley and wheat are fed to self-produced or purchased feeder cattle on the crop farm. Most crop farmers limit their cattle feeding activity from the fall to the early spring when their labor is not required for crop production. Some family crop farms are now large enough so that they reduce fixed cost per head by continuously feeding cattle. They may purchase some of the needed grain.

The words cattle or livestock yards were most frequently associated in an earlier era with public stockyards in major cities or towns where feeder and finished cattle and other species of livestock were held and shown to prospective buyers on a daily basis.

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Changes in Feedlot Size

Feedlot size has increased nationally over the past 25 years.[3] The major expansion can be seen in the construction and successful operation of large, over 16,000-head, and very large, up to 100,000-head, one-time capacity lots. The gradual increase in the number of large lots and the increasing importance of large and very large lots have changed the cattle-beef industry.

[3]The first part of this section refers to cattle feedlot size data provided by the National Agricultural Statistics Service (NASS). Lot capacity data are provided in ranges; for example, under 1,000-head, one-time capacity, 1,000-1,999, etc. The small lots are mostly owned and operated by family-labor-size feeders who generally feed only one or two groups of cattle per year and the lots remain unused or used at less than full capacity part of the year. The larger lots are generally owned and operated as a full-time business and the owners attempt to keep the lots full every week of the year.

Potential and realized economies in lot operation, market exchange, and entrepreneurship were closely associated with the increase in lot size as was the increase in number of cattle that were fed in lots. Small lots, 1,000 or fewer head, continued to decrease during the past 25 years.

Small Feedlots Decrease While Large Feedlots Increase

The total number of cattle feedlots decreased by over 70 percent from 163,722 in 1962 to 46,883 in 1989 in the 13 cattle feeding States (fig. 6, table 7). Lots of under 1,000-head, one-time capacity declined by 72.2 percent, while lots of 1,000-head and more capacity increased by 29.7 percent. California, Idaho, Arizona, Oklahoma, Washington, Kansas, and Colorado lost over 80 percent of their small lots between 1962 and 1989. In the 1980's, the number of small lots decreased from 76,175 to 45,235 while the decrease in the number of 1,000-head or more lots was only 248 in the 13 States. Some of the small lots were expanded to handle over 1,000-head, one-time capacity while some of the large lots were constructed initially to hold over 1,000 head.

Figure 6
Number of cattle feedlots with under 1,000-head and 1,000-head and more capacity, 1962-89, 13 major cattle feeding States

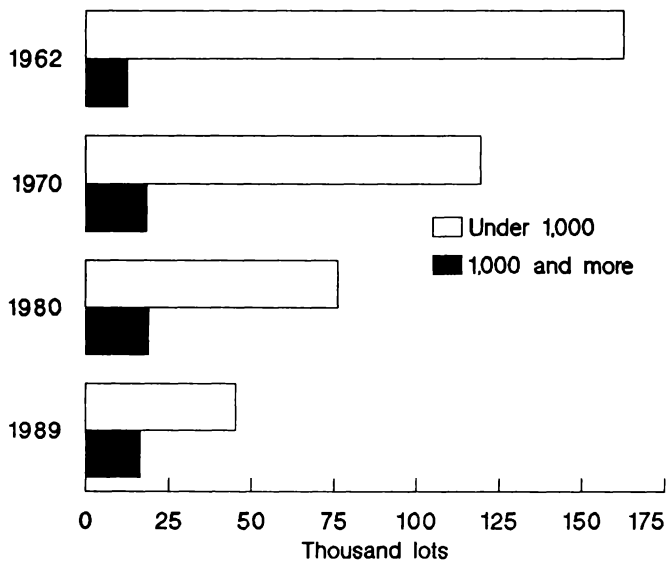


Table 7—Number of cattle feedlots by capacity and percentage change, 1962-89

State	Feedlot capacity								Percentage change, 1962-89		
	Under 1,000 head				1,000 head and over				Under 1,000	1,000 and over	Total
	1962[1]	1970	1980	1989	1962	1970	1980	1989			
	Number of lots								*Percent*		
Thirteen States:											
Texas	1,600	1,300	931	639	203	227	166	161	-60.1	-20.7	-55.6
Kansas	14,947	8,868	3,252	1,626	53	132	248	274	-89.1	417.0	-87.3
Oklahoma	2,159	753	280	[2] 223	29	47	35	27	-89.7	-6.9	-88.6
Colorado	1,200	654	200	130	80	184	200	165	-89.2	106.2	-77.0
Nebraska	23,991	18,400	12,525	8,320	312	514	375	480	-65.3	53.8	-63.8
Idaho	870	546	286	45	60	89	64	58	-94.8	-33.0	-88.9
Washington	585	262	106	[2] 49	39	30	19	16	-91.6	-59.0	-89.6
South Dakota	10,780	9,049	5,951	4,142	20	51	49	58	-61.6	190.0	-61.1
Minnesota	23,979	18,162	10,681	5,945	21	38	69	55	-75.2	161.9	-75.0
Arizona	95	8	4	[2] 7	94	53	29	8	-92.6	-91.5	-92.1
Iowa	49,964	41,829	29,532	16,250	36	171	468	250	-67.5	594.4	-67.0
California	305	153	17	9	300	272	84	46	-96.0	-84.7	-90.9
Illinois	31,976	23,952	12,410	7,850	24	48	90	50	-75.4	108.3	-75.3
Total	162,451	119,436	76,175	45,235	1,271	1,856	1,896	1,648	-72.2	29.7	-71.4
Ten States:[3]											
New Mexico	96	23	0	NA	34	45	31	NA	-100.0	-8.8	-76.2
Wisconsin	5,996	7,793	5,781	NA	4	7	19	NA	-3.6	375.0	-3.3
Michigan	2,495	1,673	1,350	NA	5	27	50	NA	-45.9	900.0	-44.0
Oregon	603	319	479	NA	45	37	21	NA	-20.6	-53.3	-22.8
Ohio	14,488	9,472	5,787	NA	12	28	13	NA	-60.1	8.3	-60.0
Indiana	14,982	13,473	9,676	NA	18	27	24	NA	-35.4	33.3	-35.3
Montana	577	424	29	NA	23	77	45	NA	-95.0	91.3	-89.3
Pennsylvania	6,000	5,997	2/6,000	NA	4	3	0	NA	0	100.0	-.1
Missouri	17,984	15,466	4,465	NA	16	34	35	NA	-75.2	118.8	74.9
North Dakota	3,693	1,979	1,437	NA	7	21	13	NA	-61.1	85.7	-58.1
Total	66,914	55,719	35,004	NA	168	306	251	NA	-47.7	49.4	-48.9
	Percent of lots										
Thirteen States:											
Texas	88.7	85.1	84.9	79.9	11.3	14.9	15.1	20.1	--	--	--
Kansas	99.7	98.5	92.9	85.6	.3	1.5	7.1	14.4	--	--	--
Oklahoma	98.7	94.1	88.9	89.2	1.3	5.9	11.1	10.8	--	--	--
Colorado	93.8	78.0	50.0	44.1	6.2	22.0	50.0	55.9	--	--	--
Nebraska	98.7	97.3	97.1	94.5	1.3	2.7	2.9	5.5	--	--	--
Idaho	93.5	86.0	81.7	43.7	6.5	14.0	18.3	56.3	--	--	--
Washington	93.8	89.7	84.8	75.4	6.2	10.3	15.2	24.6	--	--	--
South Dakota	99.8	99.4	99.2	98.6	.2	.6	.8	1.4	--	--	--
Minnesota	99.9	99.8	99.4	99.1	.1	.2	.6	.9	--	--	--
Arizona	50.3	13.1	12.1	46.7	49.7	86.9	87.9	53.3	--	--	--
Iowa	99.9	99.6	98.4	98.5	.1	.4	1.6	1.5	--	--	--
California	50.4	36.0	16.8	16.4	49.6	64.0	83.2	83.6	--	--	--
Illinois	99.9	99.8	99.3	99.4	.1	.2	.7	.6	--	--	--
Total	99.2	98.5	97.6	96.5	.4	1.5	2.4	3.5	--	--	--
Ten States:											
New Mexico	73.9	33.8	0	NA	26.1	66.2	100.0	NA	--	--	--
Wisconsin	99.9	99.9	99.7	NA	.1	.1	.3	NA	--	--	--
Michigan	99.8	98.4	96.4	NA	.2	1.6	3.6	NA	--	--	--
Oregon	93.1	89.6	91.4	NA	6.9	10.4	8.6	NA	--	--	--
Ohio	99.9	99.7	96.5	NA	.1	.3	3.5	NA	--	--	--
Indiana	99.9	99.8	96.8	NA	.1	.2	3.2	NA	--	--	--
Montana	96.2	84.6	55.8	NA	3.8	15.4	44.2	NA	--	--	--
Pennsylvania	99.9	99.9	99.9	NA	.1	.1	.1	NA	--	--	--
Missouri	99.9	99.8	99.6	NA	.1	.2	.4	NA	--	--	--
North Dakota	99.8	98.1	99.5	NA	.2	1.9	.5	NA	--	--	--
Total	99.7	99.5	99.3	NA	.3	.5	.7	NA	--	--	--

NA = Not available. -- = Not applicable. Note: 1962 was the first year that the Statistical Reporting Service (now National Agricultural Statistics Service) reported fed cattle marketing by feedlot size.

[1]Feedlots in the 23 States represented 97.7 percent of feedlots in 32 States. [2]Lots from larger size groups were included to avoid disclosing individual operations. [3]Discontinued in 1981. Percentage change for 1962-80.

Source: Various issues of *Cattle on Feed*, U.S. Department of Agriculture, National Agricultural Statistics Service.

In the 10 second-tier cattle feeding States, there was a 47.7-percent drop in cattle feedlots between 1962 and 1980 (table 7). Almost all of the small lots in New Mexico and Montana stopped feeding cattle between 1962 and 1980.

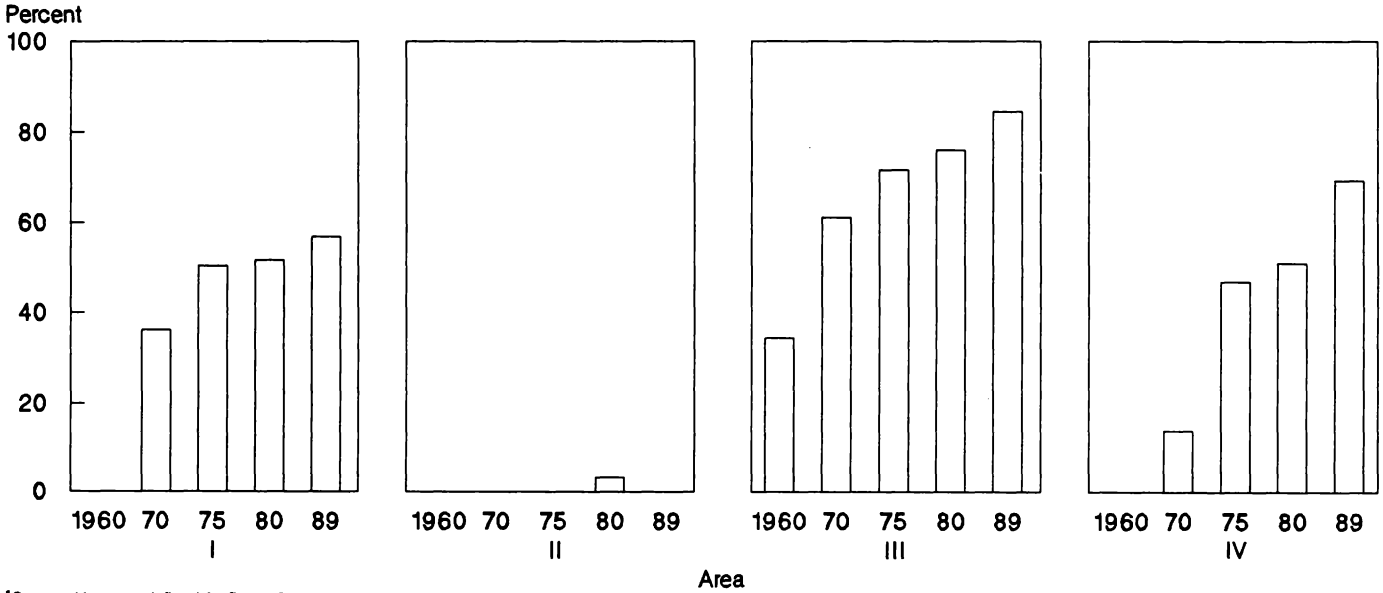
The number of 4,000-head and more one-time capacity lots showed major increases between 1962 and 1989 in Nebraska, Colorado, Kansas, and Oklahoma (area I), while the number decreased in California and Arizona (area III) (table 8). The number of the two largest size lots, 16,000-31,999 and 32,000 and over, went from none in 1962 to 42 in 1989 in Kansas and from none to 19 in Colorado and increased from none to 22 in Nebraska and from none to 68 in Texas. Iowa had only four of the largest size feedlots while South Dakota had only three during the 27-year period. Within the second tier of 10 cattle feeding States, only Montana, New Mexico, and Oregon had lots above 8,000 head in capacity between 1962 and 1980 (table 9).

Table 10 further summarizes the importance of large feedlots in the four cattle feeding areas. The 16,000-head and more lots became increasingly important in fed cattle marketed in Nebraska, Colorado, Kansas, Oklahoma, and Texas (area I), from 0 percent in 1962 to 57 percent in 1989 (table 10, fig. 7). In area III, the two largest size lots accounted for 35 percent of the marketings in 1962 and 85 percent in 1989, while in area IV the largest lots accounted for 0 percent of the marketings in 1962 and 69 percent in 1989. The large lots were not important in area II at any time during the 27-year period. Over 16,000-head lots accounted for only 3.3 percent of the marketings in area II in 1980, and even the 8,000-15,999 lots accounted for 3 percent or less of the marketings in the area between 1962 and 1987.

The increasing importance of large feedlots is broken down by State in table 11. In 1962, Texas had no marketings from the two largest size feedlots (16,000-31,999 and 32,000 and over). By 1970, this had changed. In 1970, 60 percent of all cattle marketed came from the two largest size feedlots. By 1989, marketings from the largest lots increased to over 80 percent. The two largest size lots, over 16,000 head, accounted for over 60 percent of the marketings in Kansas in 1989, 82 percent in Oklahoma, and about 66 percent in Colorado. In Nebraska, the two largest size lots accounted for only about 22 percent of the marketings in 1989, with the small lots that are still prevalent in the eastern grain production area accounting for about 25 percent. The two largest size lots were also important in Idaho, Washington, Arizona, and California, but were nonexistent or unimportant in the other 13 cattle feeding States in 1989.

Figure 7

Percentage of fed cattle marketed by feedlots of 16,000 and more capacity by geographic area, 13 States, 1962-89[1]



[1]Geographic area defined in figure 3.

Table 8—Number and percentage of cattle feedlots with 1,000-head and more capacity by capacity groups, by State, 13 States, 1962-89

State	Feedlot size (head)														
	1,000-1,999					2,000-3,999					4,000-7,999				
	1962[1]	1970	1975	1980	1989	1962	1970	1975	1980	1989	1962	1970	1975	1980	1989
	Number														
Arizona	30	7	8	0	0	25	8	8	[2] 7	0	21	13	6	0	0
California	106	67	17	9	3	100	76	19	10	6	41	52	26	22	8
Colorado	31	82	63	75	49	19	37	63	61	54	16	30	25	20	29
Idaho	37	36	17	20	21	12	23	20	15	18	[2] 11	19	8	14	6
Illinois	21	36	40	70	40	0	6	5	20	10	[2] 3	[2] 6	[2] 5	0	0
Iowa	33	88	75	330	200	[2] 3	57	65	96	[2] 50	0	21	19	29	0
Kansas	24	31	15	102	98	8	35	18	42	51	12	25	40	33	34
Minnesota	17	33	36	50	45	[2] 4	5	10	15	10	0	0	3	[2] 4	0
Nebraska	202	295	170	195	170	75	126	110	85	157	24	63	51	50	80
Oklahoma	13	15	8	5	0	10	14	9	6	5	[2] 6	7	7	7	6
South Dakota	20	37	40	31	24	0	[2] 11	16	11	21	0	0	7	4	[2] 13
Texas	98	60	26	21	10	60	44	21	15	17	31	36	27	27	24
Washington	22	6	0	5	0	12	11	[2] 4	0	[2] 5	[2] 5	6	7	[2] 5	0
	Percent of all lots														
Arizona	15.9	11.5	15.7	0	0	13.2	13.1	15.7	[2] 21.2	0	11.1	21.3	11.8	0	0
California	17.5	15.8	10.1	8.9	5.5	16.5	17.9	11.9	9.9	10.9	6.8	12.2	16.6	21.8	14.5
Colorado	2.4	7.5	11.7	18.8	16.6	1.5	3.4	11.7	15.3	18.3	1.3	2.7	4.6	5.0	9.8
Idaho	4.0	5.7	3.0	5.7	20.4	1.3	3.6	3.6	4.3	17.5	1.2	3.0	1.4	5.0	5.8
Illinois	.7	.2	.3	.6	.5	0	.03	.04	.2	.1	[2] .1	[2] .03	[2] .04	.1	0
Iowa	.7	.2	.3	1.1	1.2	[2] .06	.1	.2	.3	[2] .3	0	.1	.1	0	0
Kansas	.2	.3	.2	2.9	5.2	.1	.4	.3	1.2	2.7	.1	.3	.6	.9	1.8
Minnesota	.7	.2	.3	.5	.8	0	.03	[2] .1	.1	.2	0	0	0	[2] .04	0
Nebraska	.8	1.6	1.1	1.8	1.9	.3	.7	.7	.7	1.8	.1	.3	.3	.4	.9
Oklahoma	.6	1.9	2.3	1.6	0	.5	1.8	2.5	1.9	2.0	[2] .3	1.0	2.0	2.2	2.4
South Dakota	.2	.4	.4	.5	.6	0	.1	.2	.2	.5	0	.1	.1	.1	[2] .3
Texas	5.4	3.9	2.4	1.9	1.2	3.3	3.9	1.9	1.4	2.1	1.7	3.2	2.5	2.5	3.0
Washington	3.5	2.3	0	4.0	0	1.9	3.9	[2] 2.2	0	[2] 7.7	[2] .8	2.3	3.9	[2] 4.0	0

See footnotes at end of table.

Continued--

Table 8—Number and percentage of cattle feedlots with 1,000-head and more capacity by capacity groups, by State, 13 States, 1962-89--Continued

State	Feedlot size (head)														
	8,000-15,999					16,000-31,999					32,000 and over				
	1962[1]	1970	1975	1980	1989	1962	1970	1975	1980	1989	1962	1970	1975	1980	1989
	Number														
Arizona	11	11	8	[2] 7	0	7	8	9	5	5	0	6	9	10	3
California	37	47	33	21	11	13	20	25	15	10	3	10	11	7	8
Colorado	[2] 14	22	21	22	14	0	[2] 13	15	15	10	0	0	6	7	9
Idaho	0	7	8	9	9	0	4	6	[2] 6	[2] 4	0	0	0	0	0
Illinois	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Iowa	0	5	6	9	0	0	0	0	4	0	0	0	0	0	0
Kansas	[2] 9	21	25	40	49	0	16	26	24	29	0	4	7	7	13
Minnesota	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nebraska	[2] 11	20	30	30	51	0	7	9	11	17	0	3	4	4	5
Oklahoma	0	7	10	9	7	0	[2] 4	[2] 7	[2] 8	5	0	0	0	0	4
South Dakota	0	3	[2] 4	0	0	0	0	0	3	0	0	0	0	0	0
Texas	[2] 14	42	37	35	42	0	33	43	42	35	0	15	25	26	33
Washington	0	7	6	4	5	0	0	4	[2] 5	[2] 6	0	0	0	0	0
	Percent of all lots														
Arizona	5.8	18.0	15.7	21.2	0	3.7	13.1	17.6	15.2	33.3	0	9.8	17.6	30.3	20.0
California	6.1	11.1	20.8	20.8	20.0	2.2	4.7	15.7	14.9	18.2	.5	2.4	6.9	6.9	14.5
Colorado	[2] 1.1	2.0	3.9	5.5	4.7	0	[2] 1.2	2.3	3.8	3.4	0	0	1.1	1.8	3.1
Idaho	0	1.1	1.4	2.6	8.7	0	.6	1.1	[2] 1.7	[2] 3.9	0	0	0	0	0
Illinois	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Iowa	0	.01	.02	.03	0	0	0	0	.03	0	0	0	0	0	0
Kansas	[2] .06	.2	.4	1.1	2.6	0	.2	.4	.7	1.5	0	.04	.1	.2	.7
Minnesota	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nebraska	[2] .05	.1	.2	2.3	.6	0	.04	.06	.9	.2	0	.02	.03	.03	.06
Oklahoma	0	.9	2.8	2.9	2.8	0	[2] .5	[2] 2.0	[2] 2.5	2.0	0	0	0	0	1.6
South Dakota	0	0	[2] .04	0	0	0	0	0	.05	0	0	0		0	0
Texas	.8	2.6	3.4	3.2	5.2	0	1.9	3.9	3.8	4.4	0	.9	2.3	2.4	4.1
Washington	0	2.4	3.3	3.2	7.7	0	0	2.2	[2] 4.0	[2] 9.2	0	0	0	0	0

NA = Not available.

[1]1962 was the first year that the Statistical Reporting Service (now National Agricultural Statistics Service) enumerated and reported fed cattle marketings by feedlot size.

[2]Lots from larger size groups were included to avoid disclosing individual operations.

Source: Various issues of *Cattle on Feed*, U.S. Department of Agriculture, Statistical Reporting Service and National Agricultural Statistics Service.

Table 9—Number and percentage of cattle feedlots with 1,000-head and more capacity by capacity groups, by State, 10 States, 1962-80

State	Feedlot size (head)															
	1,000-1,999				2,000-3,999				4,000-7,999				8,000-15,999			
	1962[1]	1970	1975	1980	1962	1970	1975	1980	1962	1970	1975	1980	1962	1970	1975	1980
	Number															
Indiana	18	[2] 20	20	20	0	4	[2] 5	[2] 4	0	3	0	0	0	0	0	0
Michigan	5	19	21	40	0	8	12	7	0	0	0	3	0	0	0	0
Missouri	11	18	21	26	5	[2] 16	10	[2] 9	0	0	[2] 4	0	0	0	0	0
Montana	15	39	13	12	[2] 8	21	19	14	0	13	13	15	0	4	[2] 5	[2] 4
New Mexico	10	10	0	0	12	9	12	6	7	12	7	10	5	[3] 9	15	[3] 9
North Dakota	4	13	13	[2] 9	3	[2] 8	[2] 5	0	0	0	0	[2] 4	0	0	0	0
Ohio	[2] 12	[2] 28	[2] 25	10	0	0	0	0	[2] 3	[2] 5	0	0	0	0	0	0
Oregon	29	14	5	7	12	15	9	[2] 10	0	3	5	NA	0	[2] 5	[2] 4	[2] 4
Pennsylvania	4	[2] 3	[2] 3	[2] 10	0	0	0	0	0	0	0	0	0	0	0	0
Wisconsin	[2] 4	[2] 7	7	9	0	0	6	[2] 6	0	0	0	0	0	0	0	0
	Percent of all lots															
Indiana	.1	[2] .1	.2	.2	0	.03	[2] .05	[2] .04	0	.02	0	0	0	0	0	0
Michigan	.02	1.1	1.2	2.9	0	.5	.7	.5	0	0	0	.2	0	0	0	0
Missouri	.06	.1	.2	.6	.03	[2] .05	.1	[2] .2	0	0	[2] .04	0	0	0	0	0
Montana	2.5	7.8	8.5	16.2	[2] .8	4.2	12.5	18.9	0	2.6	8.5	20.3	0	.8	[2] 3.3	[2] .5
New Mexico	7.7	14.7	0	0	9.3	13.2	27.3	19.4	5.4	17.6	15.9	32.3	3.9	[3] 5.8	34.1	[3] 29.0
North Dakota	.1	.1	1.4	[2] .6	.08	[2] .09	[2] 1.3	NA	0	0	0	[2] .3	0	0 0	0	0
Ohio	[2] .08	[2] .3	[2] .3	.2	0	0	0	[2] .05	0	0	0	0	0	0	0	0
Oregon	4.5	3.9	1.5	1.4	1.9	4.2	2.7	[2] 2.0	[2] .05	.8	1.5	NA	0	[2] 1.4	[2] 1.2	[2] .8
Pennsylvania	.07	[2] .05	[2] .05	[2] .2	0	0	0	0	0	0	0	0	0	0	0	0
Wisconsin	.07	[2] .09	.1	.2	0	0	0.9	.1	0	0	0	0	0	0	0	0

NA = Not available.

[1]1962 was the first year that the Statistical Reporting Service (now National Agricultural Statistics Service) enumerated and reported fed cattle marketing by feedlot size.

[2]Lots from larger size groups were included to avoid disclosing individual operations.

[3]New Mexico had five lots in 1970 and 1975 and six lots in 1980 with 16,000-31,999 capacity.

Source: Various issues of *Cattle on Feed*, U.S. Department of Agriculture, Statistical Reporting Service and National Agricultural Statistics Service.

Table 10—Percentage of fed cattle marketed by feedlot size and geographic area, 13 States, 1962-89[1]

Area and year[2]	Total fed cattle marketed	Distribution of total head marketed by feedlot size						
		Under 1,000	1,000-1,999	2,000-3,999	4,000-5,999	8,000-15,999	16,000-31,999	32,000 and over
	1,000	*Percent*						
Area I:								
1962	4,353	52.4	8.0	7.5	11.8	[3] 20.4	0	0
1970	11,084	23.2	6.2	7.3	11.0	16.2	[3] 24.0	12.1
1975	10,479	15.5	3.9	5.6	8.4	16.2	29.2	21.2
1980	13,601	12.8	4.3	6.7	8.8	16.0	[3] 26.7	24.9
1989	17,140	[3] 8.1	2.4	6.1	8.2	18.4	23.5	33.4
Area II:								
1962	5,012	95.5	3.3	.8	[3] .4	0	0	0
1970	7,118	89.7	3.8	2.7	[3] 2.1	1.7	0	0
1975	4,773	86.2	4.7	3.3	2.7	[3] 3.0	0	0
1980	4,930	71.3	12.3	7.3	[3] 4.1	1.9	3.3	0
1989	3,490	67.4	13.8	12.4	[3] 6.4	0	0	0
Area III:								
1962	2,412	3.2	5.1	11.0	15.2	31.0	26.4	8.1
1970	2,826	.7	.7	3.8	9.1	24.4	30.3	30.9
1975	2,379	.3	.8	2.2	6.9	18.6	33.0	38.6
1980	1,807	.4	.6	[3] 2.4	4.2	16.4	30.2	45.8
1989	1,272	[3] 1.5	.3	1.0	3.9	8.7	25.9	58.7
Area IV:								
1962	479	39.0	13.4	16.5	[3] 31.1	0	0	0
1970	782	13.2	6.7	13.0	18.2	35.0	13.9	0
1975	645	8.5	3.3	[3] 7.8	12.6	20.9	47.0	0
1980	968	6.4	2.5	3.4	9.4	21.2	[3] 57.1	0
1989	1,053	2.0	2.0	7.7	3.7	15.3	[3] 69.3	0

[1]1962 was the first year that the Statistical Reporting Service (now National Agricultural Statistics Service) enumerated and reported fed cattle marketing by feedlot size.

[2]Areas are the same as figure 3. They include the following States: area I = Texas, Kansas, Oklahoma, Colorado, and Nebraska; area II = South Dakota, Minnesota, Iowa, and Illinois; area III = Arizona and California; area IV = Idaho and Washington.

[3]Lots and marketings from other size groups are included to avoid disclosing individual operations.

Source: Various issues of *Cattle on Feed*, U.S. Department of Agriculture, Statistical Reporting Service and National Agricultural Statistics Service.

On a national basis during the 1980's, a few very large lots were providing most of the fed cattle. For the first time in 1988, NASS provided a special classification of feedlots of 50,000 head and over (tables 12 and 13, and fig. 8). About 17 percent of the Nation's fed cattle were finished in 32 lots, 0.068 percent of the total feedlots in the 13 quarterly reporting cattle feeding States. Fifty-one percent of all fed cattle marketed came from 198 lots. The lots represented less than one-half of 1 percent of all lots. Two-thirds of the fed cattle came from 391 lots that accounted for less than 1 percent of all lots in 1989. In 1980, 1,097 lots finished two-thirds of the fed cattle, representing about 1 percent of all the cattle feedlots.

To avoid lot disclosure, NASS grouped the States differently from the area grouping in figure 3. Table 13 shows that in 1989, 29 percent of the cattle in Arizona, Texas, and California came from 50,000-head and above size lots, while 13.8 percent came from these size lots in Colorado, Kansas, and Nebraska. Only 8.7 percent came from the largest lots in the other seven States.

Table 11—Fed cattle marketed and percentage marketed by feedlot size, by State, 23 States, 1962-89[1]

Area and year[2]	Total fed cattle marketed	Distribution of total head marketed by feedlot size						
		Under 1,000	1,000-1,999	2,000-3,999	4,000-7,999	8,000-15,999	16,000-31,999	32,000 and over
	1,000	*Percent*						
Thirteen States:								
Texas--								
1962	756	13.9	11.5	14.4	25.7	34.5	0	0
1970	3,138	3.1	1.7	3.6	9.0	23.2	29.2	30.3
1975	3,067	1.6	.7	1.7	4.4	15.8	43.0	32.8
1980	4,160	1.2	.4	1.1	5.4	12.8	36.4	42.6
1989	4,745	.8	.3	.8	3.5	14.2	28.5	51.9
Kansas--								
1962	774	67.7	3.5	2.6	7.5	[2] 18.7	0	0
1970	1,890	26.2	2.8	5.7	11.1	16.5	26.1	11.6
1975	2,264	12.5	.7	1.9	11.5	19.6	35.9	18.0
1980	3,015	6.7	6.0	5.0	9.0	25.6	28.1	19.6
1989	4,245	1.4	1.4	4.2	6.3	25.2	28.4	33.2
Oklahoma--								
1962	186	51.1	7.5	14.0	27.4	0	0	0
1970	542	9.2	5.3	10.3	10.9	23.4	[2] 40.8	0
1975	515	3.5	1.2	4.5	5.6	24.3	61.0	0
1980	650	2.8	.8	3.5	5.7	17.5	69.7	0
1989	765	[2] 2.6	0	2.0	5.2	7.8	32.7	49.7
Colorado--								
1962	815	28.6	6.1	8.6	14.7	[2] 42.0	0	0
1970	1,905	15.1	5.8	6.6	12.4	17.1	[2] 43.0	0
1975	1,838	7.6	4.6	10.5	10.2	14.2	20.4	32.5
1980	1,951	5.9	4.9	11.9	9.2	11.8	18.8	37.4
1989	2,315	1.5	3.2	8.9	11.0	9.3	18.6	47.5
Nebraska--								
1962	1,822	72.6	9.3	5.5	4.9	[2] 7.7	0	0
1970	3,609	45.3	12.2	11.2	12.0	8.6	6.0	4.7
1975	2,795	40.4	10.1	10.0	9.7	13.7	8.6	7.5
1980	3,825	35.3	7.5	11.8	12.4	13.6	11.8	7.6
1989	5,070	24.5	5.1	12.4	13.8	22.3	13.8	8.1
Idaho--								
1962	221	35.7	11.8	13.6	[2] 38.9	0	0	0
1970	434	13.8	10.4	13.6	21.7	15.4	25.1	0
1975	330	3.9	6.4	12.4	11.2	28.2	37.9	0
1980	568	5.6	3.3	5.8	10.4	29.4	[2] 45.4	0
1989	617	2.3	3.4	8.1	6.3	21.9	[2] 58.0	0

See footnotes at end of table.

Continued--

Table 11—Fed cattle marketed and percentage marketed by feedlot size, by State, 23 States, 1962-89[1]--Continued

Area and year[2]	Total fed cattle marketed	Distribution of total head marketed by feedlot size						
		Under 1,000	1,000-1,999	2,000-3,999	4,000-7,999	8,000-15,999	16,000-31,999	32,000 and over
	1,000	*Percent*						
Washington--								
1962	258	41.9	14.7	19.0	24.4	0	0	0
1970	348	10.3	2.0	12.9	14.4	60.3	0	0
1975	315	13.3	0	[2] 2.9	14.0	13.3	56.5	0
1980	400	7.5	1.3	0	8.0	9.5	[2] 73.8	0
1989	436	[2] 1.6	0	[2] 7.1	0	6.0	[2] 85.3	0
South Dakota--								
1962	451	91.4	8.6	0	0	0	0	0
1970	552	83.9	6.3	3.3	6.5	0	0	0
1975	561	64.7	8.2	5.4	7.3	14.4	0	0
1980	600	70.3	7.0	5.5	5.0	0	12.2	0
1989	570	37.3	8.2	15.3	[2] 39.1	0	0	0
Minnesota--								
1962	609	93.8	2.8	[2] 3.5	0	0	0	0
1970	877	93.7	5.1	1.1	0	0	0	0
1975	762	91.6	5.0	[2] 3.4	0	0	0	0
1980	760	87.4	6.6	2.6	3.4	0	0	0
1989	525	82.9	9.5	7.6	0	0	0	0
Arizona--								
1962	568	6.3	4.1	7.7	19.2	25.5	37.2	0
1970	860	.2	.7	2.7	8.8	16.9	29.5	41.2
1975	729	.1	.9	1.8	3.6	8.4	28.5	56.7
1980	554	.7	0	[2] 3.1	0	[2] 5.8	16.8	73.6
1989	342	[2] 4.4	0	0	0	0	33.0	62.6
Iowa--								
1962	2,687	96.9	2.5	[2] .6	0	0	0	0
1970	4,522	89.9	3.3	3.1	2.3	1.4	0	0
1975	2,645	88.2	3.7	3.4	2.2	2.4	0	0
1980	2,690	62.3	16.2	9.5	5.4	3.4	3.2	0
1989	1,775	68.5	16.3	[2] 15.2	0	0	0	0
California--								
1962	1,844	2.3	5.4	12.0	14.0	32.7	23.0	10.6
1970	1,966	1.0	.8	4.3	9.2	27.7	30.7	26.5
1975	1,650	.4	.7	2.4	8.3	22.6	35.0	30.6
1980	1,253	.3	.8	2.2	6.1	21.1	36.2	33.4
1989	930	.4	.4	1.3	5.4	11.8	23.3	57.3

See footnotes at end of table.

Continued--

Table 11—Fed cattle marketed and percentage marketed by feedlot size, by State, 23 States, 1962-89[1]--Continued

Area and year[2]	Total fed cattle marketed	Distribution of total head marketed by feedlot size						
		Under 1,000	1,000-1,999	2,000-3,999	4,000-7,999	8,000-15,999	16,000-31,999	32,000 and over
	1,000	*Percent*						
Illinois--								
1962	1,265	94.9	3.5	0	[2] 1.6	0	0	0
1970	1,167	91.2	3.4	1.5	[2] 3.9	0	0	0
1975	805	89.4	5.2	1.6	[2] 3.7	0	0	0
1980	880	85.2	9.1	5.7	0	0	0	0
1989	620	79.2	15.3	5.5	0	0	0	0
Total--								
1962	12,256	59.8	5.7	5.8	8.6	[2] 13.3	5.2	1.6
1970	21,810	41.6	4.7	5.5	8.1	13.2	[2] 16.6	10.2
1975	18,276	31.6	3.7	4.6	6.9	13.3	[2] 22.7	17.2
1980	21,306	25.0	5.8	6.3	7.3	13.0	[2] 20.4	22.3
1989	22,955	16.3	4.0	6.3	7.3	15.3	[2] 20.5	30.3
Ten States:								
New Mexico--								
1962	129	20.2	7.8	22.5	14.0	35.7	0	0
1970	399	1.3	4.0	5.5	17.8	34.8	[2] 36.6	0
1975	270	.4	0	[2] 2.6	14.8	54.1	[2] 28.2	0
1980	332	0	0	[2] 2.4	8.4	29.5	[2] 59.6	0
Wisconsin--								
1962	168	95.8	4.2	0	0	0	0	0
1970	217	94.5	5.5	0	0	0	0	0
1975	186	83.3	9.1	7.5	0	0	0	0
1980	202	80.7	6.9	12.4	0	0	0	0
Michigan--								
1962	208	97.6	2.4	0	0	0	0	0
1970	254	82.7	7.9	9.4	0	0	0	0
1975	244	75.0	11.5	13.5	0	0	0	0
1980	207	64.7	20.3	7.2	7.7	0	0	0
Oregon--								
1962	148	42.6	14.2	10.1	[2] 33.1	0	0	0
1970	166	22.3	9.0	12.0	7.8	[2] 48.8	0	0
1975	145	22.8	2.1	11.0	15.9	48.3	0	0
1980	134	6.8	3.0	14.9	75.4	0	0	0
Ohio--								
1962	376	94.7	5.3	0	0	0	0	0
1970	429	91.1	8.9	0	0	0	0	0
1975	379	85.0	15.0	0	0	0	0	0
1980	244	84.0	6.2	9.9	0	0	0	0

See footnotes at end of table.

Continued--

Table 11—Fed cattle marketed and percentage marketed by feedlot size, by State, 23 States, 1962-89[1]--Continued

Area and year[2]	Total fed cattle marketed	Distribution of total head marketed by feedlot size						
		Under 1,000	1,000-1,999	2,000-3,999	4,000-7,999	8,000-15,999	16,000-31,999	32,000 and over
	1,000	*Percent*						
Indiana--								
1962	355	94.1	5.9	0	0	0	0	0
1970	517	87.2	6.2	2.2	4.5	0	0	0
1975	346	91.3	5.8	2.9	0	0	0	0
1980	344	87.5	7.0	5.5	0	0	0	0
Montana--								
1962	100	60.0	16.0	[2] 24.0	0	0	0	0
1970	184	6.5	12.5	27.7	22.8	30.4	0	0
1975	132	17.4	6.1	15.2	37.1	[2] 24.2	0	0
1980	83	1.2	4.8	10.8	47.0	[2] 36.1	0	0
Pennsylvania--								
1962	142	94.4	5.6	0	0	0	0	0
1970	128	93.0	[2] 7.0	0	0	0	0	0
1975	117	96.6	[2] 3.4	0	0	0	0	0
1980	88	[2] 100.0	0	0	0	0	0	0
Missouri--								
1962	542	88.6	5.0	6.5	0	0	0	0
1970	684	90.2	2.9	[2] 6.9	0	0	0	0
1975	338	88.8	4.1	3.3	3.9	0	0	0
1980	185	77.8	10.8	11.4	0	0	0	0
North Dakota--								
1962	136	89.7	5.9	4.4	0	0	0	0
1970	96	65.6	14.6	[2] 19.8	0	0	0	0
1975	67	40.3	20.9	[2] 38.8	0	0	0	0
1980	73	50.7	9.6	0	[2] 39.7	0	0	0
Total--								
1962	2,304	84.2	6.2	[2] 4.7	[2] 2.9	2.0	0	0
1970	3,074	69.4	6.4	6.1	4.7	[2] 8.7	4.7	0
1975	2,224	66.2	6.3	6.2	6.7	[2] 11.2	3.4	0
1980	1,892	56.6	6.8	5.8	5.4	[2] 10.5	11.8	3.0
Total 23 States--								
1962	14,560	63.7	5.8	5.6	7.7	11.5	4.4	1.3
1970	24,884	45.0	4.9	5.6	7.7	12.7	15.2	8.9
1975	20,500	35.3	4.0	4.6	6.8	12.8	20.6	15.9
1980	23,198	27.6	5.8	6.2	7.2	12.8	19.7	20.7

Numbers may not add to 100 percent due to rounding.

[1]1962 was the first year that the Statistical Reporting Service (now National Agricultural Statistics Service) enumerated and reported fed cattle marketing by feedlot size.

[2]Lots and marketings from other size groups are included to avoid disclosing individual operations.

Source: Various issues of *Cattle on Feed*, U.S. Department of Agriculture, Statistical Reporting Service and National Agricultural Statistics Service.

Table 12—U.S. fed cattle marketed by feedlot size and number of lots, 1980 and 1989[1] [2]

Lot size head	Lots			Cattle marketed		
		Cumulative			Cumulative	
	Number	Number	Percentage of total	Number	Number	Percentage of total
	--- *1,000* ---		*Percent*	---- *1,000* ----		*Percent*
1989:						
50,000 and over	32	32	0.07	3,811	3,811	16.6
32,000-49,999	47	79	.17	3,142	6,953	30.3
24,000-31,999	52	131	.28	2,444	9,397	40.9
16,000-23,999	67	198	.42	2,268	11,665	50.8
8,000-15,999	193	391	.83	3,503	15,168	66.1
4,000-7,999	212	603	1.29	1,666	16,834	73.3
2,000-3,999	390	993	2.12	1,442	18,276	79.6
1,000-1,999	666	1,659	3.54	919	19,195	83.6
Under 1,000	45,224	46,883	100.00	3,760	22,955	100.0
Total	46,883	46,883	100.00	22,955	22,955	100.0
1980:						
32,000 and over	69	69	.059	4,806	4,806	20.7
16,000-31,999	140	209	.184	4,575	9,381	40.4
8,000-15,999	202	411	.363	2,957	12,338	53.2
4,000-7,999	248	659	.582	1,661	13,999	60.4
2,000-3,999	438	1,097	.968	1,448	15,477	66.6
1,000-1,999	1,051	2,148	1.895	1,356	16,803	72.4
Under 1,000	111,178	113,326	100.00	6,395	23,198	100.0
Total	113,326	113,326	100.00	23,198	23,198	100.0

[1]Data were available only for 13 States in 1989 and 23 States in 1980.

[2]Number of feedlots with 1,000-head or more capacity is the number of lots operating at any time during the year. Number of feedlots under 1,000-head capacity is the number of lots operating at the end of the year.

Source: 1989 data, U.S. Department of Agriculture, *Cattle on Feed*, An Mt. (1-89) National Agricultural Statistics Service (NASS), and 1980 data, *Cattle*, final estimates, SB-720, Statistical Reporting Service. The data for feedlots by lot size above 32,000 were made available for the first time for 1988.

Disclosure requirements prevented NASS from providing information on the 20 largest cattle feedlot companies in the country. The *Cattle Buyers Weekly* did so in 1988 (table 14). While the headquarters address State is not necessarily an indication of the location of the lots, the addresses are generally in the States that the NASS data show have the largest feedlots. Assuming that the lots are continuously nearly full, the 20 feedlot companies were able to provide more than one-fourth of all fed cattle marketed in 1988 and may have finished about one-third.

The 20 feedlot companies owned an average of about four lots each. There was no direct relationship between the number of lots owned by a company and average lot size. The smallest average size lot was 12,000-head, one-time capacity, while the largest size lot was 100,000 head. The 83-lot average was 39,460-head, one-time capacity.

Figure 8

Percentage of U.S. fed cattle marketed by feedlot size, 1989

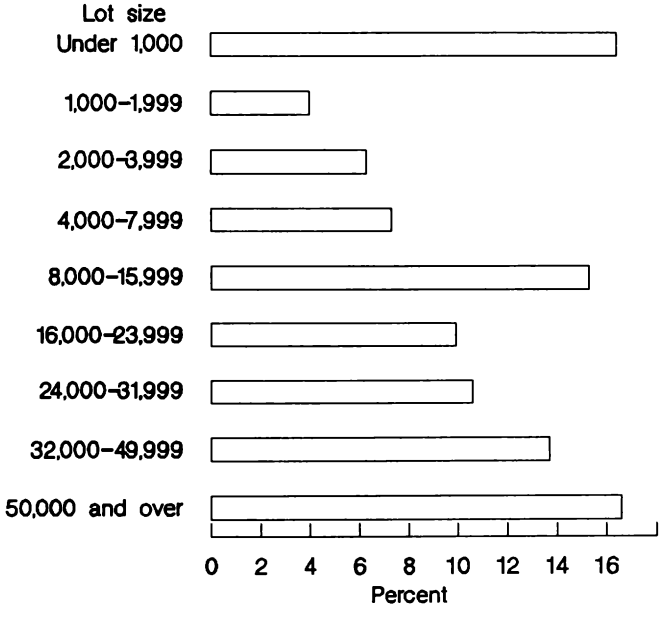


Table 13—Fed cattle marketed, number of feedlots, and percentage marketed by feedlot size by region, 13 States, 1989

Region	Total fed cattle marketed	Feedlot size[1]								
		Under 1,000	1,000-1,999	2,000-3,999	4,000-7,999	8,000-15,999	16,000-23,999	24,000-31,999	32,000-49,999	50,000 and over
	1,000 head	*Number of lots*								
Arizona, California, Texas	6,017	[2] 655	13	23	32	53	25	25	25	19
Colorado, Kansas, Nebraska	11,630	10,076	317	262	143	114	35	21	18	9
Seven other States	5,308	[3] 34,493	336	[3] 105	37	[3] 26	7	6	4	4
Total	22,955	45,224	666	390	212	193	67	52	47	32
		Percent of total head marketed								
Arizona, California, Texas	6,017	[3] 1.0	.3	.9	3.6	13.0	11.5	16.4	24.3	29.0
Colorado, Kansas, Nebraska	11,630	11.4	3.3	8.5	10.3	20.7	11.2	9.7	11.0	13.8
Seven other States	5,308	[3] 45.1	9.5	[3] 9.8	[3] 4.9	4.2	5.2	6.3	7.4	8.7
Total	22,955	16.4	4.0	6.3	7.3	15.3	9.9	10.6	13.7	16.6

[1]Number of feedlots with 1,000-head or more capacity is the number of lots operating at any time during the year. Number under 1,000-head capacity is the number at the end of the year.

[2]The 13-State totals show the actual number of feedlots and number of animals marketed in each size group. The sum of the numbers shown by States under a specified size group may or may not add to the 13-State total for that size group, since, for some States, size groups are combined to avoid disclosing individual operations.

[3]Lots and marketings from other size groups are included to avoid disclosing individual operations.

Source: *Cattle on Feed,* An Mt. (1-90) U.S. Department of Agriculture, National Agricultural Statistics Service, Jan. 24, 1990. Numbers may not add to 100 percent due to rounding.

Table 14—Feedlot size, 20 largest U.S. cattle feedlot companies[1]

Feedlot headquarters	Number of lots	Total one-time capacity[2]	Average one-time capacity
	Number	------ *Head* ------	
Colorado[3]	5	335,000	67,000
Texas	7	335,000	47,900
Texas	6	275,000	45,900
Texas	5	260,000	52,000
Missouri	10	280,000	28,000
Texas	6	240,000	40,000
Texas	4	170,000	43,000
Oklahoma	3	160,000	53,000
Texas	3	160,000	53,000
Idaho	3	130,000	43,000
Colorado	4	125,000	31,000
Nebraska	3	105,000	35,000
Nebraska	2	100,000	50,000
California	1	100,000	100,000
Arizona	1	100,000	100,000
Texas	3	100,000	33,000
Missouri	2	85,000	43,000
Nebraska	6	75,000	13,000
Kansas	3	70,000	23,000
Colorado	6	70,000	12,000
Total	83	3,275,000	39,460

[1]Ranked in order of the largest one-time capacity.
[2]Reported turnover of fed cattle averaged 2 to 2.5 times annually. For instance, the second largest one-time capacity lot marketed approximately 800,000 head from its seven lots in 1987.
[3]Includes two lots of approximately 100,000-head, one-time capacity each.
Source: *Cattle Buyers Weekly*, Aug. 8, 1988, updated with supplemental information and rounded.

Economies of Size in the Cattle Feeding Industry

Feedlot size economies, as well as economies in buying inputs and selling finished cattle, are important to lot owners and custom feeding investors when deciding on the size that will maximize returns to equity. In 1987, cattle feedlot size ranged from lots that fed a few head to large lots owned and operated like other economic sector industrial firms. Technical economies of size can occur as fixed costs of physical lot investment and labor are spread over more units of output. In addition, entrepreneurial and management coordination can be spread over more units of specialized management that is feasible as lot size increases (*12*). This section covers traditional as well as large-size feedlot economies of size, and buying and selling and related entrepreneurship that become more important as lot size increases.

Economies of size analysis has been an important part of agricultural structural analysis over the past half century. In earlier years, economic analysis focused on helping individual cattle feeders decide on their size of operation. This was done through studies and analysis of other similar cattle feeders in a State or region or through development of synthetic budgets for various size operations. The studies generally assumed cattle would be fed the crops that were grown on the family farm. Labor was generally provided by the farm family, and in some cases, hired help. Feeder cattle were generally purchased and placed in the farm feedlot after harvest and finished by the following planting season. Since labor was a constraining factor, and many cattle feeders also had other livestock operations, economies of size in cattle feedlots were reached at 100 or less head prior to the 1950's. When mechanization of feed handling, milling, and snow and manure removal became widely available in the 1950's, and with later improvements, one family and a hired hand could handle 1,000 head of feeder cattle at one time (*13*).

As large-scale cattle feeding became more mechanized and the consumer demand for fed beef increased, cattle feeders found that commercial feedlots could be constructed and operated independently of crop farms and cattle ranches. When crop or cow-calf farmers became involved in establishing commercial feedlots, one or more family members could be put in charge of the feedlot without having to manage the crop part of the operation. As feedlots grew larger, more employees were required and job responsibilities became defined. Specialized entrepreneurial and management structures were also developed.

Technical Economies

Technical economies refer to the internal operation of a plant, farm, or firm. Classical economic theory suggests that costs per unit of output are highest at a small size in the production of a product, decline to a low point, and then increase (fig. 9). Costs per unit of output decrease from small to larger size, since fixed costs for labor, machines, and equipment are spread over more units of output. After a low point is reached, variable costs increase since management may not be able to effectively coordinate all of the expanded activities.

Almost all technical economies of size studies over the past half century, whether on cattle, corn, or hogs, for example, have shown costs to not increase per unit of output beyond a low point on an average cost curve (fig. 10). The studies have generally shown that costs flatten at a certain size, with the then available technology, among the size range of operating firms. Over time, the low point is reached at a larger size in most economic activities as new technologies, such as larger more efficient machines and equipment, become available and allow one person to cover more units of output. At some output level, machines and equipment are fully utilized and further expansion requires an additional machine or piece of equipment. At that point, costs increase until a size is reached at which the added machine and piece of equipment are fully utilized (fig. 11).

Since California was an early leader in constructing large cattle feedlots, a 1957 study by Hopkin is referenced as a benchmark for economies of size analysis (*5*). Cattle feedlot analysts generally conclude that the study results are still relevant. The study included four average lot sizes of 866, 2,696, 8,223, and 26,866 head. Daily feed costs were found to vary inversely with the number of head fed. The average daily feed costs, net of manure value, totaled 13.02, 10.10, 9.26, and 8.02 cents per day, per head, for the smallest to the largest group. To determine nonfeed costs, the lots were grouped together according to the number of head fed to total feedlot capacity. The percentages were as follows: 0.94, 1.47, 1.81, and 2.4. The corresponding average daily nonfeed costs were 11.13, 9.89, 9.17, and 8.52 cents per head, per day.

The nonfeed cost results emphasize the importance of fully utilizing feedlot capacity. Hopkin concluded that, on average, the larger feed yards had the lower per-unit operating costs. The relationship between size and costs was consistent among all the size groups, which led Hopkin to correctly conclude in 1957 that the likelihood of the upper limit on the size of feed yards in California had not yet been reached.

Gustafson and Van Arsdall reviewed several internal firm economies of size studies from different areas of the country in 1970 (*4*). They found results similar to those of Hopkin. However, they concluded that most economies in nonfeed cost were achieved at between 5,000- and 7,500-head capacity and that there were not diseconomies at larger sizes. Instead, costs leveled out at larger sizes. Gustafson and Van

Figure 9
Classical cost curve

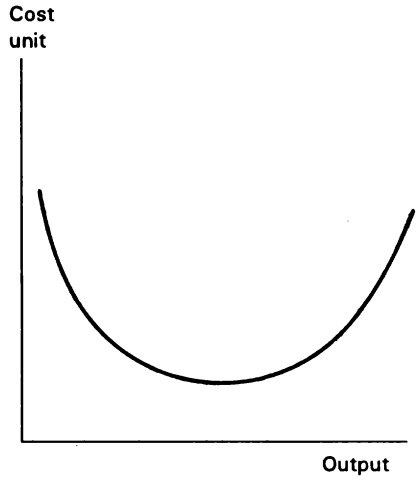


Figure 10
Common empirical cost curve

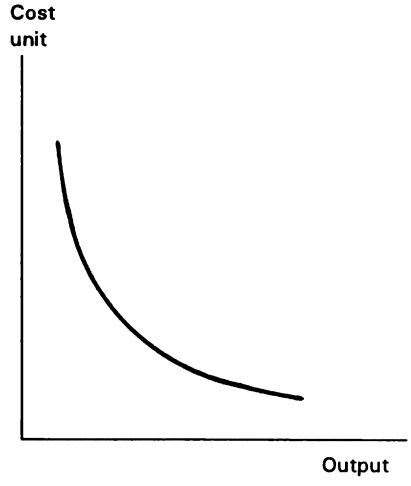
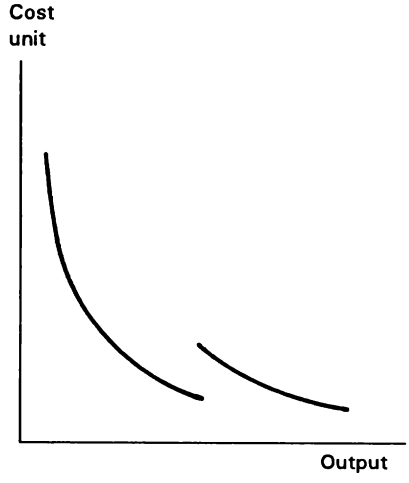


Figure 11
Farm growth cost curves



Arsdall concluded that feed costs did not seem to be related to differences in size of operation as closely as nonfeed costs. The limited available information in 1970 indicated that larger operations may have been at a disadvantage in feed conversion but may have had some advantage in buying and formulating rations. The analysts concluded that comparisons of feed efficiency among feedlots of different sizes became difficult when operations were not homogeneous as to region, kind of cattle, and feeds fed.

Madsen and Gee reported in 1986 that average total investment per head of fed beef capacity in Colorado ranged from $192.83 for 4,000- to 7,999-head feedlots to $155.15 for feedlots with over 16,000-head capacity (*11*). They concluded that economies of size in the construction of large feedlots were evident, especially in the purchase of equipment, pollution control facilities, pens, handling facilities, and vehicles.

Madsen and Gee reported that 4,000- to 7,999-head lots had total costs of $62.98 per hundredweight of gain while lots of more than 16,000 head had total costs of $64.14 per hundredweight of gain in 1984. The 4,000- to 7,999-head lots needed a selling price of $62.42 to cover all the lot costs, while the larger lots needed $62.46.

Madsen and Gee also developed enterprise budgets that showed 4,000- to 7,000-head lots could show a return of $36.49 per head, while lots with 16,000-head or more capacity could have shown a return of $31.87 per head above all costs. Since the larger lot return was positive, the larger lots stood to earn more total returns.

Specialization in feeding steers or heifers can affect economies of size in feedlots. Madsen and Gee also analyzed rates of gain per day, 2.87 pounds per day for steers versus 2.6 pounds for heifers. Steers were slightly more efficient feed converters requiring 8.6 pounds and heifers 8.83 pounds of feed on an actual weight basis. They concluded the differences in the daily rate of gain and feed conversion may have been explained by physiological differences between steers and heifers; heifers tend to go through a "heat cycle" that results in more physical activity while in the feed yard that results in the use of more calories.

Madsen and Gee observed that the Colorado beef industry had undergone "phenomenal" change from the late 1960's to the mid-1980's. Feedlot numbers had decreased from 1,380 in 1967 to 360 in 1984. Most of the decrease had come from feeders with less than 1,000-head capacity. The researchers' results suggesting economies of size in construction and little difference in technical economies among lots of over 4,000 head supported their observation that investors had incentives to construct lots with over 32,000-head capacity. Such size lots increased in number by 50 percent from 1973 to 1984. Since Madsen and Gee did not include the largest lot in Colorado in their study, Monfort, they were not able to determine the internal firm economies of the largest cattle feedlots in Colorado or in the country in the mid-1980's.

In summary, there seemed to be no firm consensus on the minimum capacity nationwide to obtain the available technical economies of feedlot size in the 1980's. Various analysts suggested that the range was from 10,000 to 30,000 head (*7*).

The current situation is that cattle are fed in lots with a one-time capacity of up to 100,000 head. Since several 100,000-head, one-time capacity lots have existed for several years and in different locations, we can assume that technical economies of size exist to 100,000 head as shown in figures 11 and 12, or at least substantial diseconomies do not exist. Several observations about the largest size lots are relevant. Lots of 100,000-head, one-time capacity may not be economically feasible in all U.S. locations. Thus, technical economies may be geographic or even site-specific within a geographic area.

In the Corn Belt States, for instance, climatic conditions and environmental regulatory requirements may find costs increasing as lot size exceeds from between 5,000 and 30,000 head. More expensive shelter is generally required in the Corn Belt States for protection from winter storms than is required in the Central and Southern Plains and the Southwest. The temperature extremes in the Corn Belt also require that a substantial amount of a hard surface, such as concrete, be available so that cattle can move about. Waste from cattle on concrete must either be removed frequently and applied to crop acres, or holding structures must be available so waste can be held without causing water or air pollution.

Gustafson and Van Arsdall observed in 1970 that disposal of manure loomed as a virtually undisputed diseconomy for the larger feedlots (*4*). Family-size farm feeders were finding manure a less valuable commodity in crop production as the cost of commercial nitrogen continued to decline. This

probably was not the case later in the 1970's and 1980's as nitrogen fertilizer prices increased and feeders did not need to construct expensive holding facilities. Reimund, Martin, and Moore concluded that Federal and State animal waste runoff abatement programs initiated in the 1960's would, over time, increase the comparative advantages of large feedlots over small ones (*12*). Fixed investment required to meet the standards was lower per animal in the large lots.

In the 1980's, the larger lots seemed to be coping with manure disposal problems in various ways. In some cases, the feedlot company or a private vendor could use the waste to generate electric power or could recycle it for use as fertilizer by urban consumers at a profit rather than at a disposal cost. In the process, some livestock feed ingredients were obtained. In some large feedlot areas, crop farmers who sold silage and feed to a lot agreed to remove some of the manure.

Existing lots may not grow much beyond 100,000-head capacity and new lots may not be constructed to accommodate much beyond 100,000-head, one-time capacity in any region of the country. Cattle feedlots are constructed at ground level. As they become very large space users, feed mills, storage and feed handling facilities, holding and loading pens, and other facilities may need to be duplicated at various locations in or at the outside of the lot. When feed facilities are at more than one location, feed transport cost to the cattle pens may be reduced.

Thus, instead of expanding or building a new lot beyond a one-time capacity of 25,000 to 100,000 head, a company may build or buy a second lot for the various reasons mentioned, perhaps at the 30,000- to 70,000-head size. Some feedlot investors may find, however, that expansion of lots to more than 100,000-head capacity may be more feasible, if they do not have added expenditures for environmental problems, than purchasing or constructing a second lot.

Market Exchange Economies

As feedlot size increases, entrepreneurial and management functions increase. The added management structure presents opportunities to obtain buying, selling, and finance economies. Thus, entrepreneurial opportunities and management structure of feedlots are discussed first, followed by buying and selling economies concepts.

Entrepreneurial-Management Structure

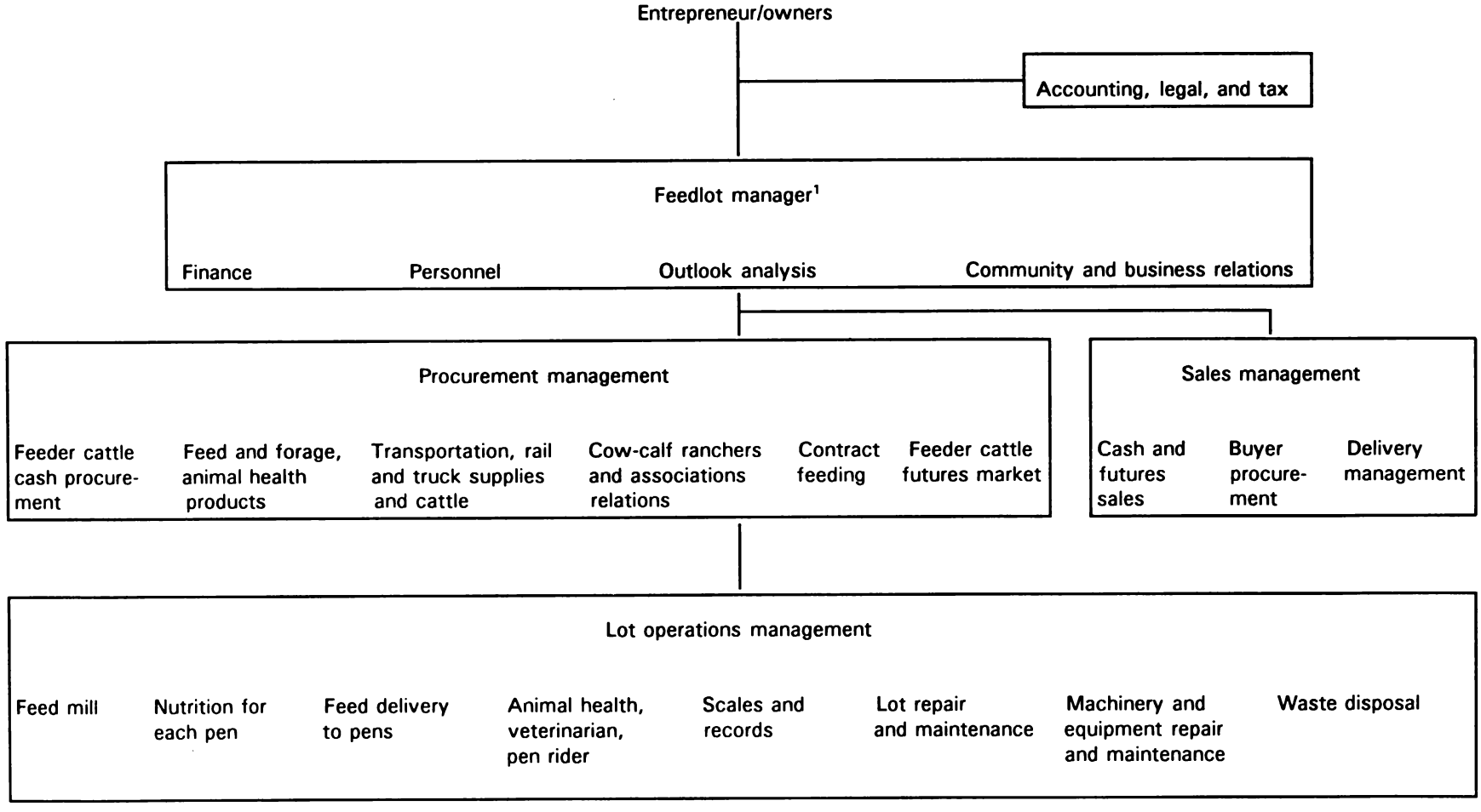
The general functions performed in any size cattle feedlot are shown in figure 12. Family-farm cattle feeders who bear all of the risk and do all of the work themselves directly and indirectly perform all of the entrepreneurial and management functions performed by a large lot. However, seasonal family-size feeders may not develop the expertise in each function, especially buying and selling, that specialists associated with large lots develop.

The exact entrepreneurial and management organization configuration of each feedlot company is different given lot size, owners' preferences, and employee capabilities. The challenge to the feedlot owner-entrepreneur is to integrate all the functions, with a unique combination of specialized employees. Employees need to continually and efficiently work together to operate one or several lots at near full capacity with an acceptable rate of return on equity on each head of cattle fed during an accounting period. Modern computer technology may have provided large lot entrepreneurs with much improved capability to coordinate all lot activities from operating and tax recordkeeping, employee work scheduling, daily risk management (including futures market and cash contract hedging), as well as daily formulation of rations for each pen of cattle. New personal computers are available to all size firms.

Owner-entrepreneurs may be involved in more than one cattle feedlot and may be either actively involved in the day-to-day operations of the enterprise or they may be employed or retired a considerable distance from the lot. The lot manager may be a full or part owner and passive investors may own the rest of the lot; or, for instance, the lot manager and one or more of the special function managers may own the lot. Investors or managers may prefer involvement in two or more lots to spread out location, management capability, and risk. One lot may have lower feeder cattle costs while another may have lower feed or operating costs. Still another lot may convert feed more efficiently or be able to consistently sell at higher prices.

Lot owners who are not involved in daily lot activities may consider the lot as a profit center similar to plant profit center concepts used by other economic sector investors and industrial firms. The lot manager assumes the full lot profit responsibility, particularly when lot owners provide an unrestricted open line of credit. In such cases, the lot manager constantly decides on the

Figure 12—Cattle feedlot enterprise organization



[1]Some employees and managers may have responsibility across submanagement lines. The transportation manager and over-the-road truck drivers may both be responsible for transport of feeder cattle and all feedlot supplies as well as finished cattle. The major function managers may serve as manager of some of the subfunctions or submanagers may cover two or more functions such as feed mill, scales, records, and feed delivery.

proportion of owned cattle versus keeping the lot at near capacity through custom feeding.

Lot owners may set up a separate company or limited partnerships to have cattle fed in the owners' lots or in other lots. Cattle feedlot companies generally charge custom feeders for all of their fixed and variable costs, and, in addition, try to obtain a profit margin. Lot owners may establish a separate company to feed their own cattle in their own lots and they may own some pens of cattle with other investors through the feeding period. They may sell the cattle part way through the feeding period to other investors, including packing companies. A feedlot company most closely resembles a human services hotel or motel firm when it does not own cattle. The feedlot company tries to achieve full occupancy and charge a flat rate for certain services and price separately for additional services. Like hotels and motels with different room sizes and quality, some lots have some preferred quality pens and charge a premium or offer discounts for long-term multiple pen customers.

The figure 12 organizational chart may appear complex and extensive to readers acquainted with family-farm cattle feeders who do everything themselves. However, a 100,000-head, one-time capacity lot may sell 240,000 or more head of finished cattle per year for $200 million or more. Thus, a multiple specialty organization is necessary. Many smaller feedlots or family-size farmers would not likely require certain of the specialized functions such as personnel management, procurement of all the required feed and supplements, cow-calf rancher relations, and perhaps records and scales management.

Onsite large feedlot organizations are perhaps more complex than other U.S. industrial firms with comparable gross sales since cattle feeding is unique. Double or even triple shifts of feedlot workers are not feasible since most of the work is done in daylight hours. Industrial manufacturing plants generally operate only 5 or 5 1/2 days, but cattle feedlots require that some functional activities be carried out 7 days per week; for example, multiple daily feeding, health inspection, and treatment. Since, on average, about 800 feeder or finished cattle are moved into and out of the largest lots each day, some weekend in-and-out cattle movement management is required. Feed and other lot inputs are also often received on weekend days since transportation firms generally operate every day. Extra weekend work is usually required when cattle become sick or climatic conditions change.

Buying and Selling Economies

When the size of a cattle feedlot is large enough so that most internal technical economies of size are realized, the degree of success of a feedlot is determined by buying and selling success (procurement and sales management, fig. 12). Feeder cattle and feed comprise the major inputs that present the greatest net price reduction buying challenge. However, astute buying of equipment and repairs, facilities repair and maintenance, and careful selection of employees who can handle job assignments efficiently and effectively can add significantly to lot survival and profitability.

Feed and related supplies and feeder cattle prices can fluctuate by as much as 50-75 percent from the lowest to the highest price in a year. Thus, timing of purchases can make a difference between a loss of $100 or more or a net return of up to several hundred dollars per head fed.

Fed cattle prices can have a range of 25 percent or more in a year (for example, $60 to $75 per hundredweight). Thus, timing of selling also presents similar profit or loss opportunities.

Table 15 illustrates results with various buying and selling success levels for a 600-pound feeder animal fed to 1,200 pounds. The table shows the greater importance of timing in selling versus buying of the feeder animal. The cost of a feeder animal may be reduced by $120 by proper timing of purchase but a finished 1,200-pound animal may bring $180 or more income when it is sold at $70 cwt versus $55 cwt. The important source of revenue, of course, rests with the feeding of cattle and selling twice the weight of animal that was purchased.

However, as illustrated, astute timing in buying of the feeder animal and feed combined, $270 lower at lowest cost, can significantly lower costs and may more than equal the importance of weight gain in the profit potential of the animal.

Buying. The challenge to procurement management is to use and act on extensive inhouse or purchased market information and analysis. The analysis may suggest purchase in the daily cash market or forward contracting for feeder animals or feed. With either type of transaction, grain and other feed supplies are usually purchased from a grain and feed company while feeder cattle are purchased directly from cow-calf or background owners. Company employees or cattle or grain order buyers

Table 15—Buying and selling success levels for a 600-pound feeder animal fed to 1,200 pounds

Cost	Fail	Moderate success	High success
Feeder animal	$80/cwt = $480	$70/cwt = $420	$60/cwt = $360
Feed and medicine (100-bushel corn equivalent)	$300	$200	$150
Total cost	$780	$620	$510
Sale	$55/cwt = $660	$60/cwt = $720	$70/cwt = $840
Net	-$120[1]	$100[1]	$330[1]

[1]Does not include transportation and associated fixed costs.

under a contract commission arrangement may be used.

Input procurement managers may also use futures and options contracts (allowing a purchaser to buy or sell a futures contract) to hedge future price changes. Physical delivery of feeder cattle and grain is possible under futures contracts but the more common arrangement is to close out a futures contract and apply the gain or loss to an immediate cash or cash futures contract transaction. While feedlot feeder cattle and feed procurement managers are responsible for physical procurement and would most likely purchase feed and grain futures contracts and options, they may also sell short futures contracts or buy, put, or sell call options. They would do so when they already own an inventory of feed or have feeder cattle under contract and expect the price of either to decrease.

Futures and options commission costs are relatively small in relation to the dollar value of the feeder cattle or grain that is controlled. For instance, on a 5,000-bushel corn contract, the commission costs may run from less than 0.5 cent per bushel by a discount broker who provides only buy and sell executions, to 1 cent per bushel or more by brokerage firms that provide consultation and buying and selling advice. Margin requirements also add a cost to futures and options contracts. If equity is used, the cost is the opportunity use of the money that is forgone. On a corn contract, margin requirements may be 50 cents per bushel. If a contract is held for 6 months and the cost of money is 12 percent, the cost of the margin money is 3 cents per bushel.

While timing of purchase of feed supplies and feeder cattle has the greatest potential to enhance returns, volume buying also may have good potential to reduce unit costs of feeding cattle. Feedlot company or contract feeder cattle buyers are in the feeder cattle market each business day for large lots that are frequently moving feeder cattle into and finished cattle out of their lots. They have a larger choice in the cattle bought and price paid.

Cattle buyers for large lots or lot companies can specialize in a geographic region or by type of immediate cash or contract buying. They usually buy directly at the ranches of cow-calf producers or backgrounders, auction markets, from producer associations, or at central feeder cattle markets. Where longer term cash contracts are involved, cattle buyers or other input procurement employees may work with the seller one or more times in providing grazing, feed, and animal health consultation. Buyers or other input procurement employees may also arrange favorable transport schedules and rates, and they may be present to supervise vaccination, weighing, and loading activities. When all of the activities are properly coordinated, feeder cattle costs, to the point of unloading at large feedlots, can be reduced by 5-10 percent over small lots.

Other volume procurement activities can also result in lower costs. The total paperwork, for instance, for a grain seller to make a 30,000-bushel sale is comparable with that for a 3,000-bushel sale but the cost per bushel is much less. There are per-unit economies in transporting 30,000 bushels of grain in trucks or rail cars to one buyer with one destination. In both cases, the buyer may get the grain seller and transport company to pass on some of the savings. When the feedlot company lacks facilities to hold full truck or railcar loads of grain, volume buying savings may be reduced.

By keeping in constant contact with the grain and transport industries, feedlot procurement managers may be able to frequently find volume price-reducing opportunities. Rail and truck deregulation permits negotiation of vendor rates. Procurers may be able to obtain the most favorable volume transport rates during certain dates when alternative use of trucks and railcars is low. They may be able to obtain needed transport services when unique opportunities to purchase grain and supplies arise. Discussion with both buyers and sellers indicates that when grain is "going out of storage condition" or storage facilities have to be emptied, the cost of a unit of cattle nutrient may be reduced between 5 and 30 percent.

Custom feeding. Custom feeding is an alternative feedlot procurement activity. Economies of size for the activity can be found in preparing prospective client materials, advertising, and in client contact and retention, including newsletter updates. A lot can choose to offer potential clients a standard contract or tailor each contract for each lot of cattle for each client. Some clients may want a contractual death loss provision or want the feedlot company to handle one or more futures or options contracts on feeder cattle, feed, or fed cattle.

Custom feeding requires added management coordination. For large units, the custom feeding manager needs close coordination with the company manager and input managers; the feedlot company has a continuous choice of feeding its own cattle versus custom feeding. Custom feeding proportion decisions can be made several months in advance of the arrival of feeder cattle in a lot. A lot may establish yearly or longer contracts with custom feeding customers for space, and negotiate feed and related costs and profit margins later. The same situation may exist for procurement of feeder cattle. Custom feeders may want the feedlot to contract for feeder cattle supplies several months in advance or purchase in the cash market at the time that custom feeding starts. Cattle owners who start their cattle feeding process in a lot may sell their cattle to a custom feeder any time up to near completion of the feeding period. Given the various activities that are involved with custom feeding, lots that are large enough to successfully specialize in custom feeding procurement can increase their returns on equity by 5 percent or more by fees collected for their services and management expertise.

Finance. Opportunities to obtain volume finance cost reductions, as well as reduce finance costs through timing of procurement, increase as lot size increases. For instance, lots with $200 million or more annual sales, plus a lot value of $100 million or more, may use $150 million to $200 million of credit per year. Finance managers need to continually be in various finance markets searching for new or improved sources of funds and contractual arrangements. Per-unit cost reductions can be obtained as size increases. There is, for instance, little extra administrative work in making and recording a $250,000 payment versus a $50,000 payment. Negotiating a $100-million line of credit apparently takes little more time than negotiating a $10-million line of credit as long as one source or representative of several sources can handle the negotiating.

Receipt of income a day or week earlier than competitors or delay of payment by a day or a week without penalty could have added significantly to net returns in the 1980's when annual interest rates were 9-12 percent or higher. Finance managers who successfully reduce finance costs by 1 percent, for instance from 11 to 10 percent, can save large lots about $2 million each year.

As feedlot size and the related magnitude of finance increase, feedlot finance managers also have the opportunity to spread the cost of interest rate and credit availability analysis over more borrowed dollars. Specialized analysis and decisionmaking ability, whether interest rate futures contracts are used or not, should be able to reduce the cost of credit by at least 5-10 percent.

Federal income tax policy has also contributed to the financing and growth of large cattle feedlots

and contributed to investments made in cattle feeding by people and firms whose primary employment and investment income was from sources other than agriculture and the cattle industry (*2, 3*). The policies also apparently encouraged firms and people employed in the industry to continue to invest in the industry. Federal income tax variables are location neutral, but when combined with technical and market exchange economies, they have not been size neutral.

The 1986 Tax Reform Act made major changes in the Internal Revenue Code so that the "investment field" is now more tax incentive neutral. This is the case between taxpayers of all sizes of taxable income and between investments in various economic sectors. The opportunity to deduct losses from agricultural investments against other taxable income was reduced substantially by the act. Capital gains reductions were also eliminated by the act. Appendix II focuses on Federal income tax policies and financing of the cattle feeding industry over the past 30 years and related changes in the structure of the cattle feeding industry.

Selling. Selling management essentially faces the same challenges as procurement management and can successfully increase returns through volume and timing of sales. As sales volume increases, the sales manager spreads price analysis over more units. When a lot uses cash sales at the time cattle are first ready for slaughter, the time and analysis of a large lot sales manager can be spread over more units of fed cattle. One of the sales manager's challenges, in cooperation with the lot production manager, is to determine fed cattle prices over the next 30 or more days compared with further feeding and overhead costs and the pressure to empty pens for the next group of cattle.

Sales managers of larger lots also have the opportunity to forward contract cash sales at any time prior to or during the feeding period if beef slaughter firms in their area purchase through forward contracts. Sales managers can spread contracting activity over more units than they can over smaller lots. Larger lots may also have some advantage in having a large enough number of cattle to choose from to meet quantity, weight, and delivery date contract specifications.

Large lot sales managers may use fed cattle futures contracts or options on contracts to hedge selling risks. Large lot managers also have the opportunity to spread hedging analysis costs over more contracts than do smaller lot managers.

Gustafson and Van Arsdall concluded that larger feedlots may have had greater advantages in marketing than in procurement (*4*). They suggested that continuous contacts in the fed cattle market provided the large volume feeder with a better knowledge of market conditions on a day-to-day basis. They also suggested that the lows of fluctuating fed cattle prices were less damaging to the large volume feeders than to producers who sell only once, or at most, a few times a year. Therefore, large lots could obtain better prices since they could attract more competitive buyers. A packer with a specific need could often obtain cattle on short notice at premium prices from the large lots. After a feedlot established a reputation with fed cattle buyers, transactions could often be made without inspection of cattle at a feedlot, thus cutting marketing costs to the advantage of both buyers and sellers.

A successful large lot sales manager should be able to average a net of $20 or more per head over a selling year more than smaller lots by using various sales techniques such as direct yard grouping of finished cattle and forward cash and futures options contract selling. Even though the salary and fringe benefits of a large lot sales manager, staff, and purchased data and analysis may average several dollars per head sold, the returns from specialized sales management to the lot owner and custom feeding investors can be substantial.

Integrating Buying and Selling. In theory, a pen of cattle would not be fed if a combination of feeder cattle and feed costs equalled or exceeded the expected income from the pen of feeder cattle. Since futures contracts are available for feeder cattle, feed, and finished cattle and cash forward contracts can be used for all three, feedlot owners, custom feeders, and slaughter firms that feed cattle should break even or show a positive return on each pen of cattle that they feed. Costs and income can, to a large extent, be guaranteed by using futures market or cash forward contracts if sufficient forward planning is undertaken.

Projected profit levels, however, may not be achieved. Expected death loss may be exceeded, feed may not be converted at the expected level, the expected rate of daily weight gain may not be achieved, or the finished cattle may not grade at the expected level. When futures market hedges are used, the basis may change enough so that a pen of cattle actually shows a negative return (*8*). For instance, corn may be purchased on a December futures market contract at $2.50 per

bushel in August. When the physical corn is needed in early December, the futures contract may be selling at $3.00 and the cash price may be $3.00 or more. Sale of the futures contract in early December would bring $3.00 per bushel, less commission and interest cost on the margin money, so that the futures transaction would lose $0.11 per bushel. Similar situations could occur with feeder and finished animal futures contracts.

Thus, some lot owners and custom cattle feeders may not use the futures markets or they may very selectively use them. They may believe, or know from experience, that they can obtain satisfactory returns from use of cash purchases and sales or by use of selective forward cash contracts and futures hedges. Lot owners and custom feeders may also use only forward contracting selectively for several reasons. Feeder cattle that are forward contracted many months in advance of scheduled entry into a feedlot may not have performed as expected and may not be ready for the feedlot. This can cause problems for the contractor in procuring other cattle to keep the feedlot full unless the contract contains a penalty release clause.

Forward contracting of feeder cattle may not be desirable for several additional reasons: the seller may want a substantial portion of the sale price at the time of contract signing; the buyer may incur substantial expense in frequently identifying, counting, and evaluating the condition of the cattle, particularly in open grazing range situations; and the seller could dispose of the cattle before delivery, thus making contract enforcement difficult.

Similar problems can occur with forward contracting of feed and closely related inputs. The seller may be unable to obtain the specified quantity and quality of feed at the agreed upon date. Transportation problems may delay arrival beyond the date when the feed input is scheduled for processing and use. The lot may also have problems in finding storage should the grain be "out of condition" or arrive before the supply in storage is used.

Feedlots can also experience problems with forward sale of finished cattle unless the contract terms are very detailed and enforceable. A lot may not be able, for instance, to have the cattle to the specified weight and grade on the specified delivery date. The packer may not be able to accept the cattle on the specified date if a plant accident occurs, workers go on a work slowdown or strike, the plant's coolers are full, and transport to fabricators, wholesalers, and retailers is not available.

Large cattle feedlots seem to have many opportunities to specialize and gain economies of size in volume and market exchange (buying and selling) timing. However, the use of various financial and futures markets has risks and many small firms may not choose to use futures markets. The actual market exchange activities and performance of cattle feedlots and custom feeders have not been extensively measured and analyzed by lot size through public-sponsored research. Such type of research is not likely to receive high public research priority and is further discussed in the concluding section of this report.

The Future for Small Feedlots

Since the NASS data system groups lots of 1,000 head or less together, such lots are commonly referred to as small lots. Lots of more than 1,000-head, one-time capacity generally require full-time management and at least part-time services of several laborers depending on lot mechanization.

Given the proven technical and apparent market exchange economies that large cattle feedlots obtain, straight-line projections of cattle feedlot size suggest that large lots will be the only ones that will survive. While the trend for large lots, as shown in table 12, to continue to feed a higher percentage of all cattle fed will likely continue, lots of 8,000 head and above may level off at about 70 percent of all cattle fed in the mid-1990's. Lots of 1,000-8,000 head may increase in importance to about 20 percent of all cattle fed. This would leave small lots with about 10 percent of all cattle fed. The remainder of this section focuses on the small lots.

Cattle feeding analysts present a wide range of views on the future for the smaller feedlots. Some believe that the family-labor-size farmer and part-time farmers will remain competitive cattle feeders by "tightening their belts in difficult times." Others believe that entrepreneurship, economies of size, and market power are so great for moderate- and large-size lots that the number of family-labor-size cattle feeders will continue to rapidly decrease.

Analysis of the future for small lots in Iowa may be instructive nationally since Iowa had nearly one-half of the cattle feedlots with under 1,000 head in 1987. Gene Futrell, Iowa State University Extension livestock specialist, suggested in an interview with Mick Kreidler in 1988 that, "we will continue to see a drastic drop in the very small and small, under 1,000-head cattle feedlots. We may

see some increase in intermediate size lots in the 1,000-3,000-head range. It is also possible that we could attract some interest in 4,000- to 8,000-head lots in the upper midwest. Feed supply condition will be favorable. Well managed lots can be competitive in the upper midwest" (*9*).

Tom J. Elam, an agricultural economist for Elanco Products Company, stated that "bringing the cattle industry back to the upper midwest in the 1990's is feasible if producers, agribusiness and lenders all work together. More innovative financing would help cattle feeders. Cattle loans based on equity rather than assets are needed. The cost of gain in the upper midwest is $6 to $8 per hundred pounds less than in the west and southwest. The upper midwest has skilled managers and good facilities. There is a trend toward reducing risk by custom feeding or retained ownership by the calf producer. With more attention to specification production and marketing strategies, we can bring beef back here" (*9*). [4]

Neither Futrell nor Elam was specific on the number and size of small and intermediate size lots that may exist in the early and late 1990's. One 8,000-head lot may feed the number of cattle that 400-500, 40-head lots feed if the 8,000-head lot operates at capacity throughout the year while the 40-head lots feed only during the late fall to early spring period. One 1,000-head lot may feed the number of cattle that 50-60, 40-head lots feed. While some 40-head lots will be feeding in the mid-1990's, most of the very small lots will likely be replaced by lots in the 500- to 1,000-head size. Some small lots will, of course, survive as part-time farm operators with good off-farm income jobs and continue to feed a few head of cattle.

The future for small feedlots in a community depends on several factors:

(1) The number of feedlots in a community. Input suppliers need enough volume to be able to provide competitive inputs (such as water tanks, animal medicines, or feed supplements) for survival.

(2) The availability of feeder cattle that packers want when finished.

(3) The proximity to slaughter plants. Cooperative or other types of group buying and selling associations may provide buying and selling services for small-size cattle feeders.

Even if favorable input supply conditions exist for small feeders in a community, many family-size cattle feeders will leave the business. Younger farmers with a low net worth may not have usable cattle feeding facilities. They may find that other noncrop enterprises, such as hog production, offer lower risk and greater labor returns. An off-farm job in the noncrop production season may be preferable to feeding cattle.

Family farmers that continue to feed small lots of cattle will probably continue to do so for reasons similar to those that have been important for several decades. Winter to early spring cattle feeding provides an off seasonal use of labor, use of low-quality hay, and use of other inputs that otherwise have little or no economic value. Small nonspecialized cattle feeders can use crop machines like tractors and wagons in their cattle feeding activities, with small outlays to cover variable costs. Such farmers would generally have a loader mounted on a tractor for farmyard snow removal that can also be used to clean the cattle yard, to move hay or silage, and to perform other operations. Cattle feeding also provides farmers with several social functions. Farmers may attend local livestock auctions, cattle feeder banquets, and feed company open houses and luncheons.

Some small cattle feeders also continue in the business to provide full or part time, late fall to early spring employment for hired help or a child who entered the business with them. Hired workers are usually most needed for crop farming the rest of the year. In such cases, the farm operator may or may not be actively involved in the daily work with the cattle. In situations where the cropping operation is not large enough to fully utilize two people, cattle feeding may also be carried out on a reduced scale during late spring, summer, and early fall.

Cattle feeding mechanization is important in family-farm situations where both crops and fed cattle are produced and cattle are fed year-round. While some crop farming machines and equipment can be used, mechanization becomes specific to cattle feeding. Such items as silo unloaders, stationary

[4]Elam's cost comment is typical of comments made by upper Midwest analysts over the past 15 or more years when the upper Midwest was seeing decreased cattle feeding. His cost of gain observations probably overstate cost of gain savings; and, consequently, they do not reflect the total profit potential in the upper Midwest versus other areas of the country.

feed augers, electric motors, and cattle feed bins are not used in crop farming. As a result, the fixed investment per head is greater but the labor requirement is lower. Such type feeding activities also may have higher costs for hard-surfaced feedlot floors and animal waste storage during the months when waste cannot be applied on crop acres.

In family-labor-size operations where cattle are not fed year-round, some of the cattle facilities, such as sheds and barns, may be used for crop machine storage. When family farms stop feeding cattle for a year or permanently, temporary cattle facilities may be converted to grain, straw, feed, or machine storage, often at low cost.

Animal welfare and health food groups have been receiving increasing public attention. The attention seems to focus on all species of livestock and poultry. The issues are emotional for those involved, whether they are farmers, consumers, or animal and closely related scientists. The words that the groups use, such as "well-being and suffering, and natural foods" are difficult to precisely define in relation to management and feeding of animals (*1, 10*). However, should the groups be successful in getting public policies enacted that would require more space or human contact per animal than that provided in commercial feedlots, or in filling "high premium" niche markets, family-labor-size farms may be able to be more competitive with the larger lots. If complying with animal welfare provisions or not using current feeding technology increases costs, however, cattle feeding may decline both in large lots and among family-labor-size farmers. This is particularly a concern to the cattle industry if the beef-consuming public is unwilling to pay higher beef prices associated with potential welfare requirements, thus switching to alternative meats or other foods.

In summary, large and small cattle feedlots will likely continue to exist, if not side by side as immediate neighbors, at least in the geographic areas most suited to cattle feeding. Various size lots may specialize in feeding certain types of cattle; consequently, they may market nonuniform cattle to different packing plants than those that specialize in slaughtering large volumes of uniform cattle.

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Conclusions

Cattle feeding has been a dynamic industry during the past 25 years and indications are that it will undergo further changes (*2*). In earlier periods, most of the cattle were fed in small lots by family-labor-size farmers, but this changed. Now, a greater number of fed cattle come from large specialized lots. Most of the growth in cattle feeding will likely focus on large lots where economies of size can be realized.

Economies Of Size

Economies of size analysis, including market exchange analysis, indicate feedlots, whether 100- or 100,000-head capacity, have become specialized. Environmental issues have become much more important. Family-size farmers or large lot investors can no longer decide that they want to locate a lot of a certain size in a certain location, pour a little "feed bunk concrete," fence the lot, obtain a water supply, and start feeding cattle in a month or less. Feedlot planning now generally requires in-depth environmental analysis. In addition, decisions by farmers or investors in lot locations must consider access to feeder cattle and changes in the location of slaughter plants. Access to debt and equity resources by feedlot owners, and their ability to manage physical as well as financial resources are also very important.

Since feedlots that feed from 10 or fewer head at one time are still in existence, attention must be paid to localized or individual factors to explain their staying power. Large cattle feedlots of up to 100,000 head would probably not have continued to exist if there were serious, internal-to-the-firm diseconomies. Exceptions may have occurred, however, where external economies including superior buying of inputs and fed cattle selling were profitable enough to offset high internal feedlot costs. There may also be situations in the short run of a few years where lot owners were able to operate with a low level of return or would accept negative returns to keep the lot going until it could be sold or the location could be converted to a different use.

Some lots may grow to larger than 100,000-head, one-time capacity, but they will essentially be replicating lots with multiple sets of feed handling equipment. Most smaller than 100,000-head lots will not grow to the largest size. Only about 100 of the largest lots would be required to feed the Nation's current output of fed cattle if they annually feed about 2.4 to 2.6 groups of cattle.

Instead, we can expect to see some lots of less than 1,000-head, one-time capacity existing within the framework of much larger size lots. Smaller lot owners, for instance, may have the ability to handle 100-1,000 head, but may not have the risk bearing or management and entrepreneurial ability to handle more cattle (*6*). The smaller lots will keep operating as long as the price they receive for their fed cattle equals or exceeds their costs. They may continue to stay in business even if the price is under their total costs. Some lots may simply accept a lower rate of return on their equity investment, labor, management, and entrepreneurial time. The smaller lots may also fill market needs in areas of lower cattle density or where specialized meat markets exist, utilizing otherwise low-value feedstuffs.

Some small lot owners may have the managerial and entrepreneurial ability to grow to a much larger size, but may choose not to do so. Their lots may be relatively efficient, allowing them to continue to compete with large lots. The small lot owners also may not want to expose their equity to greater risks or they may prefer alternative investments to cattle feeding, limiting their growth. Some lot owners may be comfortable with their present net income, and they may not want to increase their lot size. Other small lot owners may want only a small increase in size.

Industrial Structure

To date, most of the structural changes in cattle feeding have occurred without substantial public concern at the Federal policymaking level. The public, however, on occasion is concerned about concentration in various industries, changes in vertical ownership and coordination, and the effects of industrial structure on food costs or on the environment. There will likely be a continuing need for current detailed information and analysis on changes in industrial structure.

Public policy analysis in part focuses on who benefits from direct and indirect Federal Government policies and programs. Thus, to analyze public programs as they may affect investors and owners of cattle feedlots and cattle fed in lots, it may be useful to focus future analysis on identification of the various types of owner-investors in cattle feedlots and cattle feeding. If

appropriate data can be obtained, the magnitude of rates of return on various cattle feedlot investments and operator salary and fringe benefit programs should also be analyzed. Some emphasis may be placed on characterizing the various investors and owners as to whether their objectives are to qualify as active or passive investors under the Internal Revenue Code and regulations. Monitoring of reasons for lot owners expanding, contracting, or exiting the industry will also provide needed information to assist public policy development.

The data collection should permit identification by some of the major categories of investors, such as investment holding companies, meatpackers, feed and grain companies, investment syndicates or companies, as well as vertical ownership and coordination in the cattle-beef industry. The identification should also include smaller investors and owners. Information could also be obtained regarding the institutions where financial transactions occur, such as the New York Stock Exchange for a company in cattle feeding, over the counter stock markets, or private unlisted stock and partnership exchanges. Some investors may invest in a multiple product food company in more than one way, such as ownership of a company's stock and ownership of cattle in a company-owned cattle feed yard.

In the 1980's, beef processing firms became more involved in vertical coordination activities with cattle feedlots. The three largest firms that slaughtered about 60 percent of all steers and heifers and provided about 80 percent of all boxed beef in the late 1980's, were going in different directions with their coordination activities (*1*). Two of the firms owned cattle feedlots, slaughtering and merchandising the beef from some of the cattle that they fed in their own lots. The third slaughtering firm entered into private contracts with two large multiple lot feedlot companies to provide an undisclosed portion of the firm's slaughter needs at some of its plants (*3*).

The coordination activities occurred during an era when fed beef supplies were less than beef slaughter capacity. The cattle-beef industry was facing strong competition from the broiler-chicken industry and alternative foods, when human diet health issues became a national concern. One of the firms was starting to merchandise fresh branded beef and the other two were studying the topic.

The next few years will determine if beef processing firms will continue to face such problems and whether they will intensify their coordination activities with the feedlot industry. If they intensify coordination efforts, the structure of the 1,000-head and over feedlot industry, at least within 100 miles of the three firms' slaughter plants, may undergo the most rapid change. The slaughter firms may not own most of the lots, but through contractual arrangements and prices paid for fed beef they may control most of the activities in the lots.

Environmental regulations have and will affect the economies of cattle feedlots. Existing lots may face minor to major expenditures to comply with environmental requirements. Some geographic areas may be more favorable for further expansion of cattle feeding (*4, 5*). Such effects could determine the location of and size of large lots.

New technology that has become available for the cattle feeding industry has been evolutionary. Future advances could include improvements in feed conversion from biogenetic engineering by type of feeder cattle and by location. New environmental technologies would also be of interest for size and location analysis. Scientific discoveries that may reduce energy costs could encourage more large-scale cattle feeding in the major feed grain production States.

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Postscript: Cattle Industry Recommendations

In the summer of 1989, after the analysis was completed for this report, the National Cattlemen's Association released an executive summary from a beef industry concentration/integration task force on July 28, 1989, entitled "Can Beef Compete in the 1990's?" Fourteen members of the National Cattlemen's Association obtained the assistance of five university professors to identify and analyze competitive issues in the beef sector. The task force's efforts were carried out independently of the analysis in this report.

While the focus of the task force's efforts was somewhat broader than this report, the general conclusions on the topics covered in this report were similar. The task force's topics are stated as follows:

- Substantial changes have occurred in the ownership and marketing patterns in the beef industry, with notable changes occurring in beef processing, particularly in terms of concentration and merchandising methods.

- Structural changes are well along in the cattle feeding industry so that most cattle are fed by low-cost firms.

- Producers need to lower their cost of production. Beef is losing to other meats, particularly chicken and turkey, since their price to the consumer is lower. Lower costs are also necessary for U.S. beef to be competitive in international markets. Important in lowering costs will be:

  --Use of the most efficient available technology.
  --Consolidation of production into larger units so that all economies of size are realized.

- Beef sector research should increase. New processing and production technology is needed to lower domestic and export beef prices.

- Information and education programs on safety and wholesomeness of beef should be conducted.

- Producers need help with various risk management strategies, including broad access to futures markets by small producers.

Appendix I: State Restrictions on Corporate Farming

Expressions of public opposition in some States to outside corporate and alien investment in agriculture reached a high point in the 1970's. Several Northern Plains and Corn Belt States amended their existing domestic restrictive statutes or added new restrictions on "outside investors and integrators," under an umbrella notion of preserving and protecting the independent family farm. Leaders of the movement in Nebraska were unsuccessful in getting the State government to enact the desired provisions in the 1970's. However, they were successful with a constitutional amendment petition, which was approved by a voters' referendum and became effective on November 29, 1982.

The States that have enacted restrictive statutes have focused on corporations, resident and nonresident alien individuals, and, to a more limited extent, on limited partnerships. The focus has been on large corporations, whether or not chartered in the State having the statutes. The legislative efforts have not totally banned the use of a corporate form of business organization. Rather, they have limited the size of corporations in terms of number of shareholders, the relationship between shareholders, in some cases farm residency of shareholders, and the percentage of gross sales coming from other than the farm business.

While the language in the various statutes is sometimes less than clear and subject to court interpretation, a major effect has been the moral suasion that the statutes and related publicity have provided. The people have spoken and said that they do not want certain types of large "outside" business entities in various agricultural and agriculturally related activities in their States.

The statutes and the Nebraska constitutional provision were not solely inspired by a changing livestock sector, but rather by certain groups that convinced voters in the various States that outsiders would take over the family farm if not restricted from doing so. In some of the States, livestock interests were apparently strong enough so that special exceptions were made for their interests, in addition to those of independent family farmers.

Lack of adequate data prohibits direct cause and effect analysis of State corporate farming restrictions. Reactions that the author has received over the past 15 years from over 1,000 callers and letter writers suggest that the statutes, and the business and economic attributes that they portray, have resulted in investor "turn off." However, cattle feeding may not have held at previous levels or expanded in some of the States with restrictive statutes, even if the statutes had not been enacted (*2, 5, 14*).

In Iowa, however, the tight restrictions on meatpacker-cattle feeding activity and on nonfamily-farm corporations' involvement in cattle feeding may have had a major effect on the decline in the fed cattle industry since the restrictions were enacted in the mid-1970's. Nonfamily owned and operated corporate firms across the country received the message that large-scale cattle feeding was not welcome in Iowa. At the same time, the five States that have shown the greatest growth in cattle feeding have either not had State restrictions on corporate cattle feeding or have made exceptions for the livestock industry.

Nebraska is an exception since it showed an increase of about 500,000 fed cattle between 1982 and 1989. However, the 9-percent increase was entirely possible with full compliance under the new Nebraska constitutional provisions. Existing corporate cattle feeders, while not permitted to expand their operations, had sufficient feedlot capacity to have fed the added cattle along with cattle fed by unincorporated and incorporated family farms.

The growth in large Texas feedlots was also an exception from among the States with the most rapid growth in cattle feeding (*16*). Until the early 1980's, when the restrictive statute was eliminated by the legislature since it was apparently not being enforced, Texas had a statute that was designed to prohibit complete vertical ownership in the cattle industry. The statute prohibited a corporate combination of cattle raising and meatpacking. Owning and operating feedlots and feeding cattle were not considered "raising cattle," so that packers could own feedlots and feed cattle.

Current Domestic Restrictions

State restrictions and court rulings on corporate farming have been detailed and analyzed in a broad context in other publications in recent years (*13*). Harl provides a continual update of changes (*6*). Important provisions in the statutes as they may restrict large corporate investment and vertical coordination in the cattle-beef sector, either through ownership of various parts of the cattle-beef industry or contractual arrangements, are abstracted in this section (*13, 18*). The nine States that have restrictive statutes are Oklahoma, Kansas, Nebraska, Iowa, Minnesota, Missouri, North Dakota, South Dakota, and Wisconsin.

Similarities exist in the statutes in the nine States, though provisions are subject to different legal, including court, interpretations. In general, family farms can incorporate in all nine States. Seven of the States also allow other authorized corporations to own farmland to produce farm products and engage in vertically integrated farm activities. Authorized farm corporations are generally small corporations, have 25 or fewer shareholders, and have a single class of stock; 75 percent or more of the corporations' income comes from farming operations, and all shareholders are natural persons. Some of the States have, in recent years, started restricting limited partnerships. Six of the nine State statutes require reports that may be helpful in monitoring violations of the statutes.

From among the five States that showed the greatest growth in cattle feeding between 1955 and 1989, Colorado and Texas place no restrictions on any type of corporate ownership or contractual arrangements.

Oklahoma

The Oklahoma corporate restrictions exempted family-farm corporations, authorized corporations, grandfathered corporations, and livestock feeding. Grandfathered corporations may expand their landownership or amount of leased land at a rate not to exceed 20 percent in any 5-year period.

Kansas

The Kansas statute, which was changed in 1981 and amended in 1986, makes exceptions for family-farm corporations, authorized farm corporations, authorized limited agricultural partnerships, grandfathered corporations, and corporate-owned feedlots.

Thus, while livestock and meat industry interests may have to carefully check the Oklahoma and Kansas statutes and court rulings and new legislative initiatives, the two States seem to welcome present cattle feeding firms and expansion

of the cattle and beef industries. This is the case whether by direct corporate ownership of one or more sectors of the industry or through contractual arrangements.

Nebraska

Cattle and beef industry interests face a different situation in Nebraska. Nebraska has the most restrictive provisions of the nine States in the sense that the restrictions are part of the State constitution (*10*). A voter approved constitutional amendment would be required to revise the restrictions. In the other States, a simple majority vote of the State legislature and approval by the Governor can revise a statute. The Nebraska restrictions prohibit acquisition or operation of agricultural land by nonfamily-farm or ranch syndicates including limited partnerships. The meaning of farming or ranching includes the ownership or keeping or feeding of animals for the production of livestock or livestock products.

If the constitutional provisions are enforced, new growth in cattle feeding would need to come from family-farm or ranch sole proprietors, partnerships, or corporations. They would need to be engaged in farming or ranching or the ownership of agricultural land in which the majority of the voting stock is held by members of a family or their spouses, or held in a trust created for the benefit of a member of that family. According to the rules of civil law, the members of the family must be related to one another within the fourth degree of kindred. At least one member of the family must reside on or be actively engaged in the day-to-day labor and management of the farm or ranch. No member can be a nonresident alien.

The constitutional provisions may have left an opening to outside investment through family-farm corporations.[5] If a family-farm corporation fails to meet the legal criteria for a family-farm corporation, it is given up to 50 years to requalify or it must dissolve. A family farm would lose its status when more than half of the voting stock is acquired by nonfamily members, when a family member no longer resides on the farm, or when a family member is no longer actively involved in the farm's daily management and labor. If the stock of the family farm is sold to a nonfamily corporation that may be large or small, the sale disqualifies the corporation as a family corporation; but the purchasing corporation would apparently be free to own and operate the farm during the 50-year requalification period and not be subject to the constitutional provisions.

Growth may also come from other groups, including Nebraska Indian tribal corporations, nonprofit corporations or nonprofit cooperatives, nonfamily general partnerships, and nonfamily corporations that acquire agricultural land for pollution control purposes. Nonfamily qualifying feedlot corporations that were grandfathered in the constitutional provision, if not previously full the year-round, may be able to feed more of their own cattle or custom-feed cattle owned by individuals or entities qualifying as farm entities.

The constitutional provisions seem clear for large corporate meatpackers. They do not qualify to start new feedlots or expand those that they already own. Investors in a cattle feeding limited partnership cannot legally have cattle that they own custom fed in any Nebraska feedlot. However, the Nebraska constitutional provisions seem subject to interpretation on whether a grandfathered feedlot corporation or proprietor can feed cattle for a packer. The constitutional provision states that livestock purchased for slaughter are excluded.

The absence of provisions that permit authorized corporations of nonlineal family ownership, permitted in the other States with restrictive statutes, seems to make the Nebraska constitutional provisions the most restrictive from among the nine States. In addition, Nebraska does not permit trust management of agricultural land while several of the other States seem to place no restrictions on management of agricultural land by trust management.

While the Nebraska constitutional provisions seem the most restrictive, they carry no requirement for reporting corporate activities to a governmental unit. The Secretary of State is charged with monitoring the provisions and notifying the Attorney General of possible violations and, if warranted, to commence action in a district court. If the

[5]The constitutional provisions may also have left an opening on partnerships. A court ruling on a partnership between two Japanese and a Japanese-American from California is underway. They established a general partnership, Y.Q. Associates. They bought a 3,680-acre ranch in Lincoln County, Nebraska, in 1988 to produce beef to ship to Japan. The 1982 constitutional provision was silent on the topic, relying on a 1889 State law that prohibited foreigners from owning Nebraska land. The Japanese interests maintained that the 1889 law did not apply to partnerships and that any attempt to distinguish between absentee ownership by Americans from absentee ownership by foreigners was motivated by fear of foreigners.

Secretary of State or Attorney General fails to perform his or her duties, Nebraska citizens and entities have standing in a district court to seek enforcement.

The Nebraska legislature can also enact further restrictions prohibiting certain agricultural operations that the legislature deems contrary to the intent of the constitutional provisions. These provisions can work two ways. For instance, companies that want to move ahead with their cattle operations, in a way that may not be fully clear in the constitutional provisions, may be hesitant to do so knowing that they may be challenged in court. In other companies, the desire to expand may be great enough to take risks in the face of uncertainty about the provisions. Thus, companies may move ahead with activities that some citizens do not like. However, they may respect the employment that the activity provides, or the citizens may not have the resources to mount a court challenge.

Framers of the Nebraska constitutional provision apparently wanted to encourage or at least were indifferent to outside corporate investment and growth of the poultry industry. The constitutional provisions do not apply to agricultural land operated by a corporation for the purpose of raising poultry.

Iowa

The Iowa legislature enacted a corporate and partnership farming law in 1975, in part as a reaction to a perceived move by meatpackers to integrate into animal production (*13, 18*). The principal effect of the statute is to prohibit vertical integration in livestock production (*23*). Beef or pork processors, whether operating as an individual firm, partnership, or corporation, are prohibited from directly or indirectly owning, controlling, or operating a feedlot. Pork processors cannot contract to obtain custom feeding services. With the exception of family-farm corporations, authorized corporations that may own up to 1,500 acres, grandfathered corporations, security interests and trust activities, outside corporations and partnerships are not welcomed in Iowa. Iowa has one of the most complete compliance monitoring requirements. Corporations are required to file annual reports with the Secretary of State. County assessors also must provide to the Secretary of State the names of all corporations, nonresident aliens, trusts, and partnerships owning agricultural land.

Minnesota

Enacted in 1973, the Minnesota corporate farming statute prohibits corporations, limited partnerships, pension funds, or investment funds from directly or indirectly acquiring or leasing agricultural land or engaging in farming in the State. Family-farm corporations, family-farm limited partnerships and corporations with five or fewer authorized shareholders, authorized limited partnerships, and grandfathered corporations are exempted. All of the above groups must file an annual report with the Secretary of State regarding their land holdings and list the farm products that they produce or intend to produce.

The Minnesota statute exempted agricultural land either leased or owned by a corporation for the purpose of replacing or expanding asparagus growing operations. The corporation could place 2,000 acres in asparagus production, but no more than 2,700 acres after May 20, 1973. The statute seems to be very firm on prohibiting outside investors from purchasing or constructing a large feedlot operation unless they can qualify as an authorized corporation.

Missouri

The 1975 Missouri statute prohibits corporations from directly or indirectly acquiring or leasing agricultural land. Corporations not engaged in farming operations as of September 28, 1975, may not engage in farming operations unless they are a family-farm corporation, authorized farm corporation, a security interest, or are engaged in trust activities. Corporations cannot begin farming activities without first filing a report with the Missouri Department of Agriculture. They must file an updated report when their situations change.

North Dakota

Between 1931 and 1981, North Dakota had the most restrictive State law regulating corporate ownership and operation of farms. The early 1930's statute prohibited all corporations, foreign and domestic, from engaging in farming or agriculture. The single exception to the prohibition was for cooperative corporations, 75 percent of whose members or stockholders were actual farmers residing on farms or ranches depending principally on farming for their livelihood. A

corporation could, however, acquire rural land that was suitable for farming. The corporation was allowed to farm on this land for 10 years.

A new law effective July 1, 1981, permitted family-held farms and ranches to incorporate if they have 15 or fewer shareholders. The shareholders must be related to every other shareholder by lineage or they must be a spouse or person so related. Farm or ranch was defined so that it did not include a contract whereby a processor or distributor of farm products or supplies provide grain, harvesting, or other farm services. The farming or ranching definition did include production of livestock or the raising or producing of livestock or livestock products.

Thus, the statute is still designed to keep outside investors out of North Dakota livestock production through the use of a corporate form of business organization. However, since the statute is silent on limited or general partnerships, both would seem to be permitted in North Dakota. The North Dakota Tax Commissioner and the Attorney General are required to monitor compliance with the statute each year.

South Dakota

Since 1974, corporations are prohibited from owning or leasing agricultural land and from engaging in farming. Exempted corporations were those engaged in livestock breeding and feeding, poultry feeding for egg or meat production, family-farm corporations, authorized corporations, and grandfathered corporations. Corporations engaged in farming or proposing to engage in farming must file a detailed report with the Secretary of State and be certified. Corporations engaged in farming must also file an annual report with the Secretary of State. The South Dakota statute can be characterized as one that prohibits outside corporations from engaging in crop production. However, the State legislature, by exempting livestock breeding and feeding, decided to welcome cattle and other livestock growing and finishing.

Wisconsin

The 1973 Wisconsin corporate farming statute prohibited corporations from owning agricultural land and from carrying on agricultural operations. Family-farm and authorized farm corporations were exempted, as were grandfathered corporations. The exemption permitted a hybrid of the family-farm and authorized farm corporations permitted in the other States with restrictive statutes. Any corporation with no more than two classes of stock and with 15 or fewer stockholders, who are all natural persons, are exempted. Lineal ancestors and descendants, aunts, uncles, and first cousins may be grouped as one stockholder but only one such grouping is allowed in a single corporation.

Thus, the statute appears to be less intended to preserve the traditional family farm than to limit the size of farm corporations by limiting the number of stockholders. While the limitations may preclude large companies from engaging in cattle feeding, they would not seem to prevent the development of cattle feeding operations bearing little resemblance to the traditional family-farm cattle feeder.

Alien Restrictions

Alien investment in and operation of U.S. farms has long been of concern in many States (*17*). In 1986, Schian and Seid reported that 29 States had some type of law restricting alien ownership of real property (*24*). The restrictions may cause some concern for foreign interests that want to invest in cattle feeding and meat processing in the United States. Investing in the U.S. cattle feeding industry helps foreign investors to control the beef that is exported to their home countries (*3*). Since the Japanese Government has agreed to permit more beef imports, Japanese investors have shown such interest since 1987 (*22*).

The restrictions on aliens and alien business entities vary greatly among the States. States such as Idaho merely restrict the acquisition of State-owned land by aliens. Other States specifically restrict acquisition of land or agricultural land. Maryland limits its restriction to enemy aliens. The Iowa statute states that a nonresident alien, foreign business, foreign government, or an agent, trustee, or fiduciary thereof shall not purchase or otherwise acquire any interest in agricultural land in the State. The Minnesota statute prohibits alien individuals who are not permanent residents from acquiring directly or indirectly any interest in agricultural land. Indiana limits resident or nonresident aliens to 320 acres.

Nine States (Arkansas, Georgia, Illinois, Iowa, Minnesota, Missouri, North Dakota, Ohio, and Virginia) require aliens to report the land they own in the State. Alien individuals, alien corporations, or U.S. corporations in which significant interest is owned by aliens, are usually required to file the reports. Several State statutes allow or direct a

State agency charged with monitoring foreign investment to use data collected by the Federal Government.

Uncertainty Created by the Provisions

Outside cattle feeding companies and packing houses may be hesitant to consider locating in some of the States that have the firmest family-farm statutes. For example, the South Dakota family-farm statutes clearly seemed to welcome outside investment in the livestock industry. While the following activities in South Dakota were in the swine industry, a similar situation could occur within the beef industry.

In the fall of 1987, National Farms, a major meat producer that has been growing rapidly, announced that it had taken an option on land in eastern South Dakota with an intention of constructing a large hog production unit that would produce and finish about 300,000 head per year (*7, 15*). Citizens in one of the larger towns in the State and the South Dakota Pork Producers Association lobbied the State legislature to pass a new 1988 statute that would outlaw corporate hog production by nonresidents. The Governor vetoed the bill and supporters did not obtain enough votes to override the bill before the legislature adjourned. The Governor stated that local communities should be allowed to decide whether to allow corporate farms in their area. The Governor contended that the issue was not one of, "the family farming versus corporate farming," but one of free enterprise and South Dakota's ability to compete.

The State pork producers successfully petitioned for a referendum on the ballot in the statewide general election in November 1988. About 60 percent of those voting in the election approved the ban (*7, 20, 25*).

The lines between those favoring and those opposed to outside investments in developing South Dakota's hog production industry were rather clearly drawn. Both sides were apparently aware of the State Extension Service's economic development efforts over three decades. One of the Extension Service's general education observations over the years clearly indicated that the State was a long-time exporter of feed grains and feeder cattle. Those who favored the outside activity in South Dakota pork production saw the economic benefits to the State. Opponents seemed to firmly cling to the general concept of preserving the "independent family farm as the producer of South Dakota's farm output," irrespective of the overall economic impact on the State's economy.

The reaction to the efforts of South Dakota to ban outside corporate investment in the swine industry was apparently not lost on other States with family-farm statutes. Farm leadership in those States may be realizing that "outside money" will be invested where it is welcomed and that continued structural change is underway (*21*). For instance, in 1988, Iowa farmers became concerned about the trend in the livestock industry toward fewer packers, contract feeding, and forward contracting. The Iowa Farm Bureau Federation, which had supported passage of the Iowa family-farm statutes in the 1970's, found itself in a reactive position to the trends.

Speaking before the Iowa House Agriculture Committee in December 1988, the Iowa Farm Bureau Federation president stated, "more information and analysis on the trend are needed before action is taken. Solutions are not simple. Iowa should not be sending legislative signals which might indicate that we don't want the packing industry in the State" (*9*). He also suggested that the Federal Government should study the issues and the economic impact on producers of mergers and acquisitions in the livestock industry. "The federal government should act nationally since laws and regulations must be handled at the national level if Iowa producers are to be treated equitably with producers in other States."

The Iowa pork producers' association seemed to have a similar understanding about restrictive statutes at its annual meeting in January 1989. The delegates voted to encourage the National Pork Producers Council to seek national legislation prohibiting packer feeding of pork. The delegates stated that they did not want Iowa to have prohibitive rules that would drive the packing industry to less restrictive States.

The president and chief executive officer of National Farms observed that: "States like South Dakota that restrict outside investment will continue to lose ground as a competitive place to raise hogs. We have no further interest in South Dakota" (*26*). He said that he did not expect to run into problems in more capitalist-oriented States in other parts of the country. Later reports suggested several States were trying to lure the company's investment and that the company would make its new hog investment in a State that has not enacted restrictive family-farm legislation.

Impact of the Restrictive Statutes

The domestic restrictive statutes influenced the location of investment in the cattle feeding industry in the 1970's and 1980's. However, without direct evidence that investors would have invested in cattle feeding in States with the restrictive statutes if the statutes had not been in place instead of choosing cattle feeding investments in other States, we cannot be sure that more cattle feeding by outside investors would have occurred. Nonfarm residents of States such as Iowa and South Dakota may have, for instance, invested in other economic sectors when they determined that large-scale feeding was not welcomed in their States or they may have invested in other States.

Assuming that lots of 16,000-head and above capacity require equity capital that is greater than that held by family and authorized corporations, and that larger corporate investors would have built large feedlots absent restrictions, the restrictive statutes in North and South Dakota, Minnesota, Wisconsin, Iowa, and Missouri were effective in the 1970-89 period. There were only seven 16,000-head and over lots in those States in 1980 and none in 1989 (table 8). During the 1972-89 period, the number of 16,000-head and over capacity lots increased from 85 to 138 in the four States without restrictions, Texas, Oklahoma, Kansas, and Colorado. The number of 4,000-16,000 size lots stayed about the same in 1970 and 1989.

Even though Illinois did not have a restrictive statute, it still lost some cattle feeding and did not attract large lot investment. This raises a question about whether the States with restrictions would have lost some of their cattle feeding activity even if they had not had restrictive statutes. Given that off-farm employment opportunities were good in most areas of Illinois, large cattle feedlot investors may have chosen other areas for their investments, but that may not have been the case for at least some States with restrictive statutes, such as Iowa.

The increase in large lots in Nebraska also raises a question about the effectiveness of restrictive statutes. The number of 4,000- to 16,000-head size lots increased from 80 in 1980 to 131 in 1989 and the number of 16,000-head size and over increased from 10 in 1970 to 15 in 1980 and 22 in 1989. While family-farm or ranch corporations could have funded the increase in the 4,000- to 16,000-head lots, it seems likely that at least some outside money was necessary to fund the added seven, 16,000-head and more lots between 1980 and 1989. It may be that the lots were in part funded by family farms or ranch corporations that also were able to attract nonfamily corporate investors to the extent permitted by law.

Little analysis has been done on the impact of the State statutes that restrict alien investment in the U.S. cattle industry. Given the wide range of worldwide investment opportunities to nonresident aliens and alien companies, few such investors would likely have been interested in investing in U.S. cattle feeding even if the various States had not had restrictive statutes. The extent of alien investment in U.S. cow herds and cattle feeding, where permitted in the United States, has not been measured.

Japanese firms have recently expressed renewed interest in the U.S. cattle industry. Their interest is directly related to the Government's agreement to permit a greater quantity of foreign produced beef to enter Japan over the next several years. The recorded activity occurred in States without restrictive statutes such as Montana, where a Japanese company (Zenchiker Partnership) purchased a 27,832-acre ranch near Beaverhead that had 6,000 head of cattle on it in 1988 (*11, 12*). The Japanese firm that was also designated to export U.S. beef to Japan by the Livestock Industry Promotion Corporation stated that it would use the ranch as a showcase production base from which to feed cattle and export beef to Japan. The company intended to have the cattle custom-fed and tested for carcass traits. It had no intention of buying feedlots or packing plants.

There was also recorded Japanese activity in California and Washington. A Japanese meat wholesaler purchased three Washington Beef Company plants, with a current daily slaughter of 750-800 head in 1988, as well as fabrication capacity. A Los Angeles-based Japanese meat company that had been feeding cattle in central California yards purchased the Monterey County Cattle Feeders Yard in 1988. It had pen space for 60,000-70,000 head. Other reports had Japanese companies negotiating to buy other California and Illinois packing plants and searching for the highest marbling cattle.

All of these activities seem to focus on various aspects of procuring beef for the expanded Japanese export market and not to focus an active or passive investment in the U.S. cattle or beef sectors. As long as the investment continues to focus on procurement for the Japanese market it

will not likely grow to a significant part of the U.S. cattle and beef industry. The most optimistic estimates are that Japan may purchase 3-5 percent of the U.S.-fed cattle output. The amount may be smaller if the Japanese purchase their lower grades of beef from other countries that do not finish their animals to choice and prime grades prior to slaughter. For instance, Japanese interests apparently purchased three Australian packing plants in 1988 (*11*).

Since the total output of fed beef has remained about constant, from the high in fed cattle numbers in 1978 to the 1989 output, with decreases and increases in between, some States have gained economic activity and others have lost as cattle feeding has shifted among the States. Various State, municipal, and private groups have made estimates over the years of the effects of location of an economic activity on a State or municipal entity's employment.

A new or expanded economic activity conceptually creates employment beyond the activity itself (*1*). The new or expanded economic activity purchases inputs and sells products which create employment for input and marketing firms, financial institutions, transportation firms, and perhaps accounting firms. Employment expands in the community where inputs are purchased and marketed whether close or distant from the new or expanded economic activity. Employees of the firm that undertake the new or expanded activity also spend their income in the local or surrounding community for necessities such as food, clothing, shelter, medical care, and transportation, or for leisure activities.

Employees of private firms and public enterprises that obtain their employment as a result of expenditures by the new or expanded economic activity firm and its employees in turn spend money on human needs, services, and leisure. The new or expanded economic activity may expand the property, sales, and income tax base of the State or municipality where located, and may or may not require services commensurate with the new public tax revenues.

Much of the new or expanded economic activity analysis has been directed to nonfarm industrial activities such as manufacturing and processing, including meatpacking plants (*4*). However, two studies provide an estimate of the range of the impact on the State of Iowa. Otto, in a 1988 Iowa State University study, estimated that Iowa lost about 22,000 jobs as a result of the 2,834,000-head decrease in cattle fed in Iowa between 1970 and 1987 (*19*). He estimated that 19,500 of the jobs would have been directly involved in cattle production and 7,500 jobs would have been needed to supply inputs to cattle feeding and to process the fed cattle. The 7,500 jobs also included the multiplier effects from people who would have been directly employed by the cattle feeding activity in the State and the employment created when they would have spent their income in the State.

The Meat Export Foundation provided an estimate in 1988 of the effects of increased beef export sales on employment in the United States that may be helpful to States which have either been losing cattle feeding or are trying to increase cattle feeding. The foundation estimated that in the United States, about one job is created for each 70 head of fed beef that are slaughtered, processed, and exported (*8*). Using Iowa as an illustration, the State may have lost about 40,500 jobs due to cattle feeding moving to other States.

Analysts caution that the exact employment effects of cattle feeding cannot be determined without extensive study (*4*). Most of the decrease in cattle feeding in Iowa came from the 33,000 family farmers who stopped feeding an average of about six head per year. Most of the cattle feeders were also involved in crop production, and, in some cases, swine production. Where farmers expanded swine production to use the labor that had formerly been used for cattle feeding, primary employment did not decrease. Where former cattle feeders expanded crop production so that more off-season labor and management was required to repair machines, obtain crop production information, and do analysis and records work, employment may not have decreased.

In both cases, total off-farm employment dependent on farm production would have held at the peak 1970 cattle feeding period if the former cattle feeders had expanded crop production and swine input purchases and marketing to compensate for the loss of cattle feeding activity. They did not, however, do so. Many of the farmers that may have used 800-900 hours in the fall and winter months to feed cattle are probably still farming but have not found income-producing activities for all of the hours that they formerly used to feed cattle.

Analysts also observe that the location of cattle slaughter and beef processing is very important to job creation as part of cattle feeding activity. When finished cattle are slaughtered in a different State,

the State where the cattle were fed loses the slaughter activity tax base and at least a portion of the packing house employment.

Attracting new or expanded economic activity has become a major task for many State governments, towns and cities, and county and multicounty governmental units. Competition for each new or expanded enterprise without environmental problems in the United States is strong. Competing government units try to lure existing enterprises with various economic, tax, educational, and social incentives. The techniques used to attract existing, new, or expanded economic activity probably would not work well with hundreds or thousands of small family-size cattle feeders. The techniques could work with cattle feedlot companies or perhaps with entities that could be successfully set up to place and manage feeder cattle in family-size feedlots for cow-calf producers, backgrounders, packers, and other outside investors.

Family-size farmers often lack the managerial and entrepreneurial capability to expand much beyond a size that utilizes their own labor. In addition, family-size farmers have moved toward specialization in crops and livestock production. Adding a cattle feeding enterprise would add an unacceptable risk factor. An integrated contractual arrangement where family farmers supply only labor and facilities may not be appealing under restrictive family-farm statutes in the States that have lost their earlier fed cattle position.

To assess the potential for feedlot operations, feasibility studies would first be required in the States that have lost in fed cattle numbers, particularly in light of emerging environmental concerns and restrictive corporate farming legislation. Costs to comply with present and emerging environmental standards may offset lower costs for feed supplies or existing legislation may prohibit investment. Availability of efficient slaughter and beef fabrication facilities also would need to be part of the analysis and part of the incentives package that is offered to feedlot companies.

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Appendix II: Federal Income Tax Policy and Growth of Feedlots

Reimund, Martin, and Moore identified several Federal income tax variables that provided incentives for expansion of cattle feedlots and for "outside" investors to feed cattle in commercial lots (*17*). Full-time owners and operators of cattle feedlots and beef cow herds were also able to use the incentives to reduce their tax costs when their operations generated taxable income.

The major provisions of interest that could reduce Federal income taxes for those who qualified were longstanding provisions that allowed taxpayers with taxable agricultural income to use a cash method of accounting for Federal income tax purposes. Internal Revenue Service regulations generally require that an accrual method of accounting be used in other economic sectors. A closely associated provision that may also have been important was the option to treat certain capital expenditures as current expenses rather than as depreciable assets.

Key Federal Income Tax Variables

Three types of cattle production activities (cow-calf raising, cattle feeding by cattle industry people, and cattle feeding by nonfarm investors) have been relevant in the changing structure of the cattle feeding industry over the past 30 years. The Federal income tax variables used by the three activities may have also contributed to the changing structure of the industry.[6] All three types of activities have generally been allowed to use cash

[6]The discussion of tax variables is necessarily simplified since the primary focus of this report is not solely on Federal income taxes. In actual investment decisionmaking, cattle farmers and nonfarm investors would have carefully considered the interrelation of several tax variables and their own situation. Over time there have been several additional Federal income tax variables that were applicable in certain circumstances such as earned versus nonearned income, income averaging, carry back and forward of losses, and limits on capital losses that could be dedicated against taxable income. In addition, changes in the long-term capital gains holding period from 6 to 12 months and increasing the exclusion from 50 to 60 percent would have influenced investment discussion.

The Federal Tax Code

The primary objective of the Federal tax code is to collect revenue to operate the Federal Government. Provisions in the tax code and Internal Revenue Service regulations have been changed many times over the past 70 years to change the level of revenue collected. In recent decades, tax changes have been more frequent. These changes are used to encourage and discourage certain types of economic activity that affect the revenue level, and, indirectly, employment in various economic sectors and social and welfare programs. The changes have generally not been focused on a particular sector of the economy, but rather on a particular type of investment such as depreciable assets or job training for workers. The frequent changes and uncertainty about future changes create added business investment problems for private individuals and firms that are concerned with the cattle-beef industry.

Tax changes are sometimes closely coordinated with monetary policy and Federal expenditure programs. Monetary policy mainly affects the availability and cost of money and, where borrowed funds are used, the potential profitability of a cattle industry investment. Federal expenditure programs, such as those for farm commodities, also directly affect the profitability of an economic sector. Therefore, uncertainty of monetary policy, particularly the cost and availability of credit, is also a challenge for the cattle-beef and other industries.

The cattle-beef industry is basically void of direct Federal programs since the industry has long tried to avoid developing direct Federal programs that affect the supply and price of beef. However, indirect programs such as procurement of foods for secondary school programs and military personnel, and foreign food aid, have affected the use of beef. Lease terms for Federal grazing lands directly affect some cow-calf and background operators. Federal food and feed grain programs also indirectly affect the cattle-beef industry through the availability and price of cattle feed. Federal environmental protection and health programs also indirectly and sometimes directly affect the cattle-beef industry.

The U.S. Department of the Treasury has been charged with responsibility for tax policy analysis and administration of Federal tax programs. The U.S. Department of Agriculture has not been directly involved in making Federal income tax policy. Other executive departments have on occasion been consulted by the Department of the Treasury on specific issues. Thus, for the most part, the various cattle-beef industry interests in the past have directly conferred with the Department of the Treasury and the congressional tax writing committees for clarification of tax regulations or for advancing a particular tax administration or policy position.

Tax provisions have been used by entrepreneurs who have sold investments in the cattle industry. Cattle industry investments that may be marginally competitive with alternative investments may have been fully competitive or superior to alternative investments when Federal tax incentives were factored into an investment program and the proposed programs performed as planned (*2, 5, 6*). There is, however, a difference of opinion among financial analysts and planners on the weight that Federal income provisions should receive in making investment decisions. Some financial analysts suggest that most investment decisions should be made on a before-tax consideration basis to provide at least some margin should an investment plan not be actualized.

accounting to deduct expenditures against taxable income as soon as the expenditures were made. Beef cow-calf producers have been allowed to use depreciation and capital gains treatment on some animals. Both beef cow-calf ranchers and cattle feedlot owners were able to write off, within limits, certain capital expenditures incurred in development of their enterprises against taxable income during the tax year when they occurred. Investors who fed cattle in commercial feedlots were essentially limited to use of cash accounting as an investment incentive.

A fourth activity is sometimes performed by separate business entities: the growing (backgrounding) of calves from weaning time to 600-800 pounds, when the cattle are ready for a high-energy ration in a feedlot. Unless the activity

involves breeding stock, investors were limited to the benefits that can be provided by use of cash accounting.

Cash accounting privileges were granted to farm producers by administrative action in 1915 (*1, 9*). An investor, whether a farm producer or an investor with nonagricultural employment or sources of income, who uses the cash method of accounting, deducts expenses in the tax year the expenses are paid and reports income in the year it is received. Thus, by deducting expenses from current income and by accelerating or delaying income, investors could average or delay income taxes.

Investors in any of the three types of cattle activities (breeding, growing, and fattening) could prepay expenses such as feed, animal health products, and interest on borrowed funds. By prepaying for inputs ahead of actual use, an investor with an otherwise high taxable income could postpone paying taxes on the high income. In some cases, investors were able to borrow as much as 80 percent of the funds used to prepay expenses. In some of those cases, they reduced their Federal income taxes by as much as or more than the equity they had at risk in the prepaid activity.

If the sale of livestock from the prepaid inputs occurred in a tax year when the investor's total income was lower, the investor also reduced his or her total tax cost over two or more tax accounting periods. If the sale of the cattle in the second year resulted in lower than projected income from lower fed cattle prices, low weight gain, or death loss, the investor had even lower taxable income. If the sale occurred in a high-income year, the investor may have arranged to offset the higher income by expanding cattle activities and associated prepaid input costs.

While rapid growth strategies could be used under accrual accounting, carrying out rapid-growth strategies was easier and often resulted in greater tax savings with cash accounting. However, regardless of the accounting method used, follow through with a rapid growth strategy based on tax savings was not as easy in practice as it may have appeared on paper. Expected high income from self-produced cattle sales or investor income from custom feeding cattle may not have materialized, since resources may not have been readily available when needed. Also, the outlook for the type of beef cattle activity that an investor undertook may have substantially dimmed by the time the taxpayer was ready for the added resources.

Breeding stock cow-calf operators also received an added Federal income tax break. Provisions that permitted capital gains treatment from sale of qualifying breeding stock permitted a cow-calf operator to lower tax costs. Capital gains treatment generally allowed profits on long-term investments, held 12 months or more, to be taxed at a lower tax rate than ordinary income. Only 40 percent of long-term capital gains were taxed as ordinary income and the remaining 60 percent of the gain was excluded from taxation.

In addition, when cow-calf investors were able to currently expense feed and other expenses of raising breeding stock, they were further able to reduce their Federal income tax costs. In other economic sectors, an investor was not able to currently deduct an expense associated with a capital asset but rather would subtract it from the cost basis when the capital asset was sold.

These several cash accounting, and associated leverage, current expensing, and capital gains provisions, were the most helpful to high tax income investors when the marginal individual income tax rates were as high as 70 percent. A tax shelter investor in the 70-percent marginal tax bracket, who was otherwise subject to payment of $0.70 on a dollar of taxable income, saved $0.70 in Federal income tax payment. Given the potential magnitude of tax deferral and perhaps savings, small cattle producers with low taxable incomes sometimes argued that the tax laws provided unfair competition for them. Some small cattle farmers, however, welcomed the nonfarm tax shelter investment in their activities when the investment allowed them to be fully employed with increased income.

In addition to the above tax variables, some nonfarm investors as well as cattle farmers who were financially successful also used a corporate form of business organization to reduce their Federal income taxes. In 1979, the top individual marginal tax rate was 70 percent and the top corporate rate was 46 percent. In 1983, the top individual rate was 50 percent and the top corporate rate was 46 percent. Use of the corporate form of business organization and filing tax returns under Internal Revenue Code, Chapter C provisions, generally was advantageous when taxable income was in the $25,000-$30,000 range through 1983. After 1983, the relative corporate and individual marginal tax rates changed so that $35,000-$40,000 of taxable income was needed to save on taxes by incorporating (*1, 10, 11*).

The 1986 Tax Reform Act further changed the relative marginal tax rates so that incorporating to save taxes based on differences in marginal tax rates was no longer feasible. The top individual tax rate was set at 33 percent while the top corporate rate was set at 34 percent.

In addition to changes in the relative individual and corporate marginal tax rates, other changes were made in the Federal income tax code to reduce what were popularly termed "tax loss shelters." A 1976 Federal Tax Act, for instance, limited farm losses that could be deducted against taxable income from other sources to the amount that taxpayers had at risk in their farming activities. The act prohibited syndicates from deducting prepaid expenses for feed and other supplies and required corporations and partnerships (with a corporation as a partner) with gross receipts in excess of $1 million in a tax accounting period to use the accrual method of accounting (*1*). Exempted were subchapter S corporations, family corporations with at least 50 percent of the stock owned by members of the same family, family corporations where members of two families owned directly or indirectly at least 65 percent of the stock, or family corporations where three families owned at least 50 percent of the stock and substantially all the rest of the stock was owned by employees, their families, or tax-exempt employees' trusts (*1*).

Federal income tax incentives seemed to be the most generous, over time, for beef cow-calf investors (*15*). But, these incentives were also important for investors in cattle feeding and for establishment of feedlot companies, particularly where the latter could currently expense certain development expenses and set up depreciation schedules on the new facilities and equipment that allowed rapid tax writeoffs against other taxable income. Investors and cattle farmers who were involved in two or more of the activities had further tax investment incentives that resulted in additional structural change. The opportunity to expand a cattle feedlot was attractive when taxable income was high and a beef cow herd provided tax write-offs that provided capital for feedlot expansion. The opportunity to use high leverage with cattle feeding and associated tax write-offs may also have provided capital for expansion of a cattle feedlot.

While Dietrich and others measured characteristics of Texas cattle feeders in the early 1970's, the nature of nonfarm investors and the extent of their investment in cattle feeding and cattle feedlot companies have not been researched and measured by public institutions in recent years (*6*). Private sector estimates in 1986 suggested that 25-33 percent of the cattle being fed in commercial lots were owned by outside investors. Investors presumably had been attracted to feeding cattle by one or more Federal income tax variables (*16*). After 1986, such investors faced a modified set of Federal tax variables (*3*).

The 1986 Tax Reform Act

The 1986 Tax Reform Act resulted in the greatest change in the Internal Revenue Code in one act since 1954 and some analysts suggest in the history of the code. Most of the changes were not directed at the agricultural sector or the cattle industry specifically, but rather at all sectors of the economy.

The 1986 Act repealed income averaging, investment tax credits with a carryover of 65 percent of unused credits, and 15-year carryback for farmers. Capital gains provisions were repealed with the effect that the top rate on gains on capital assets went from 20 percent to 33 percent. Provisions that permitted immediate deductions for costs of raising breeding stock were changed. Capitalization was required for expenditures for animals with a preproductive period of more than 2 years. The expenditures could either be claimed later as depreciation deductions or subtracted at the time of sale from the asset price to compute the taxable gain. Extensive pressures were brought on Congress so that a change was made later on this provision to provide the producer with an option on whether to capitalize the expenses.

The 1986 Act allowed those farmers who had not been excluded from using cash accounting in the 1976 tax act to continue to do so. However, farm producers who use the cash method of accounting cannot deduct feed and other supply costs prior to the year consumed or used to the extent that they exceed 50 percent of other deductible expenses. The prepaid farm expense rule does not apply if one of three requirements is met and prepaid farm supplies exceed 50 percent of other deductible expenses because of a change in business operations directly attributable to extraordinary circumstances. The rule also does not apply if a taxpayer's total prepaid farm supplies for the preceding 3 tax years is less than 50 percent of other deductible farming expenses for the 3 preceding tax years and one of the following three requirements are met: (1) the taxpayer's principal residence is on a farm, (2) the taxpayer's principal

occupation is farming or, (3) a member of the taxpayer's family meets requirement 1 or 2 above.

Perhaps the most far-reaching changes in the 1986 Tax Reform Act that will affect nonfarm investors in cattle feeding and cow-calf operations are provisions that deal with "passive activity" investing. Since the passive activity provisions are very detailed, unique to each investor, and subject to court ruling, only the high points are covered in this report (*3, 7, 8*).

Prior to the 1986 Act, losses and credits generated from one activity could generally be used to offset income or losses from other sources. The 1986 Act limited the ability to shelter other income from an activity to taxpayers who "materially participate" in the activity generating the loss or credit. Cash accounting is the only means of offsetting regular, active income and meaningful tax deductions from cattle feeding or cow-calf investments. To qualify for use of cash accounting, under the material participation provisions, a taxpayer must be involved in the activity on a regular, continuous, and substantial basis. Investors clearly have to spend time physically at the cattle feed yard or with the cow-calf operation. The outside investor also has to carefully structure his or her relationship with consultants or managers employed to assist with the investment. Letting the consultant or manager make all decisions with only the investor's approval would disqualify the investment as active.

Ranchers and cattle farmers who regularly work in their own operations need to carefully structure their regular, continuous, and substantial involvement if they want their investments in various activities to be treated as active. If cow-calf producers retained ownership of cattle and had them fed in a commercial feedlot, they may not qualify as active investors unless they can show that they materially participated in the feeding activity. If feeder cattle are placed in two or more different feedlots or cow-calf operations are in two or more locations, a cattle farmer has to materially participate in the activities at each location in order to qualify the activity under cash accounting rules.

The passive investment provisions were phased in through 1990, which gave "cattle people" and outside investors an opportunity to adjust their investment activities. Since public information was not available on the exact nature and extent of "cattle people" and outside investor activity prior to the 1986 Tax Reform Act, nor was information obtained after 1988, it is not possible to determine the likely impact of the tax changes. Some cattle farmers and outside investors may have chosen to stay in cattle feeding and qualify under active participation but not have materially participated in the activity in 1987. If they did so, they could have created a pool of passive income or a loss that could be rolled forward indefinitely for Federal income tax purposes and be used to offset passive income or losses from other investments.

Some previous and some new investors may continue or start new cow-calf or cattle feeding investments as passive investors. Such "cattle people" and outside investors would need to appraise the investment on its own merits without tax shelter potential.

Such investors may have other passive investments and view cattle investments as a way to diversify. If one passive investment gained and another lost, the loss from one could be used to offset the gain from the other for tax purposes. Some cattle analysts have suggested that the net impact of the 1986 passive investor provisions would result in cow-calf operators increasingly retaining ownership of their own cattle through feeding and finishing activities (*4, 8*).

There was indication in 1988 that some cattle feedlot operators who had depended on investors who placed emphasis on tax loss provisions were having difficulty in keeping their lots operating at full capacity. One or more lots may have ceased operations at least in part due to the new tax provisions (*3, 4, 11, 12, 13, 14, 15*). If so, this may indicate that the tax reform provisions were having their stated effect to "level the playing field for all investors," whether owners, employees, or outsiders to the cattle industry (*14, 17*). The absence of tax shelters may mean that consumers may pay more for beef but they have alternative nonbeef food choices. Cattle people who had to compete against other cattle people who cared for tax-sheltered cattle now will have a more level playing field in obtaining resources.

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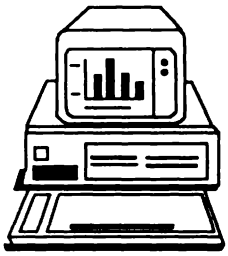

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